WATER WORKS & SEWERAGE

ENGINE AND BLOWER ROOM

COMBINATION SEWAGE-GARBAGE TREATMENT PLANT

GARY, INDIANA

THE DIVER'S work is done for keeps when a properly designed and constructed cast iron submarine line is completed. High beam-strength and compressive-strength — and its effective resistance to corrosion in fresh or sea water — make cast iron pipe the ideal material for submarine lines. We furnish pipe with various types of joints developed from a wide experience in this field.

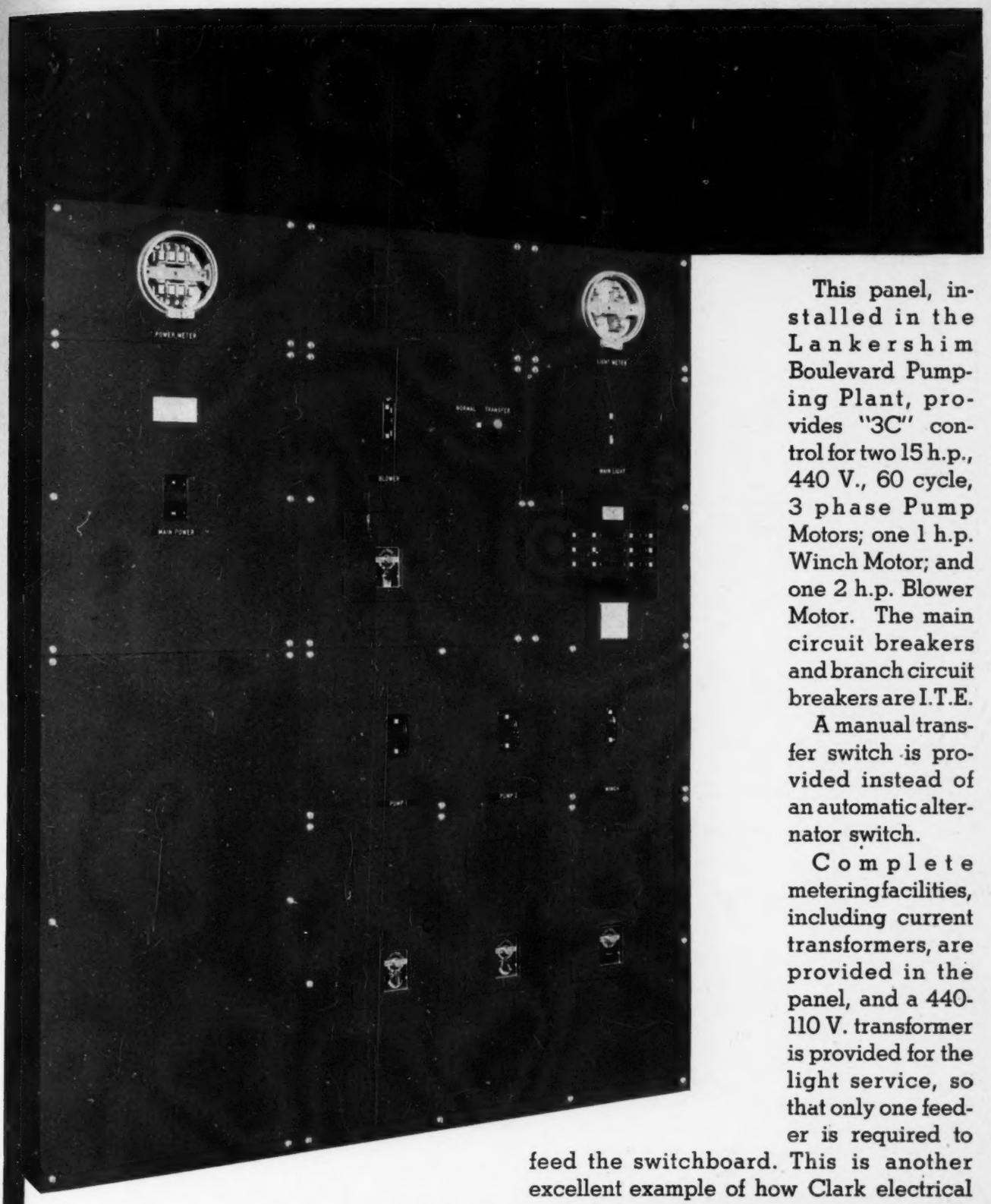
U.S. cast iron PIPE

Centrifugally or pit cast for water, gas, sewerage, drainage and industrial service.

U. S. PIPE & FOUNDRY CO.

General Offices: Burlington, N. J.

Foundries and Sales Offices throughout the U. S.



This panel, installed in the Lankershim Boulevard Pumping Plant, provides "3C" control for two 15 h.p., 440 V., 60 cycle, 3 phase Pump Motors; one 1 h.p. Winch Motor; and one 2 h.p. Blower Motor. The main circuit breakers and branch circuit breakers are I.T.E.

A manual transfer switch is provided instead of an automatic alternator switch.

Complete metering facilities, including current transformers, are provided in the panel, and a 440-110 V. transformer is provided for the light service, so that only one feeder is required to feed the switchboard. This is another excellent example of how Clark electrical control apparatus helps safeguard health and property.

OFFICES IN PRINCIPAL CITIES

THE CLARK CONTROLLER CO.

1146 EAST 152ND ST. CLEVELAND, OHIO

WATER WORKS & SEWERAGE, February, 1941. Volume 88. Number 2. Published monthly at 330 South Wells Street, Chicago, Ill., by the Gillette Publishing Company. Per copy, 25c. Subscription rate, United States $2.00 per year; Canada $2.40 per year; Foreign $3.00 per year. Copyright, 1941. Entered as Second Class Matter, June 2, 1931, at the Post Office at Chicago, Ill., under Act of March 3, 1879.

They Started Something!

WHEN VOLTA constructed the first electric cell, he brought into existence a convenient, economical source of electric energy which has found countless applications. The principle of the Voltaic cell forms the basis of the modern dry cell, and paved the way for the invention of the storage battery. Nor was the value of Volta's work limited to the field of electricity. In his search for the most effective combination of metals for the production of electrical energy, he discovered the arrangement of elements in the electro-chemical series—an arrangement that plays a part in many chemical reactions, and led to far-reaching developments in the science of chemistry.

When EBG engineers first made Liquid Chlorine commercially available in this country, their work also was destined to result in advances in widely diversified fields. In safeguarding the public health, municipal authorities found EBG Liquid Chlorine an exceptionally effective means for purifying water and limiting the spread of water-borne diseases. In the increasingly important field of sewage sterilization, EBG Liquid Chlorine is playing an outstanding part in preventing and abating pollution of rivers and harbors. And in the paper and textile industries, it has made possible new standards of efficiency and economy in bleaching processes.

The first cylinder of Liquid Chlorine made by EBG in 1909.

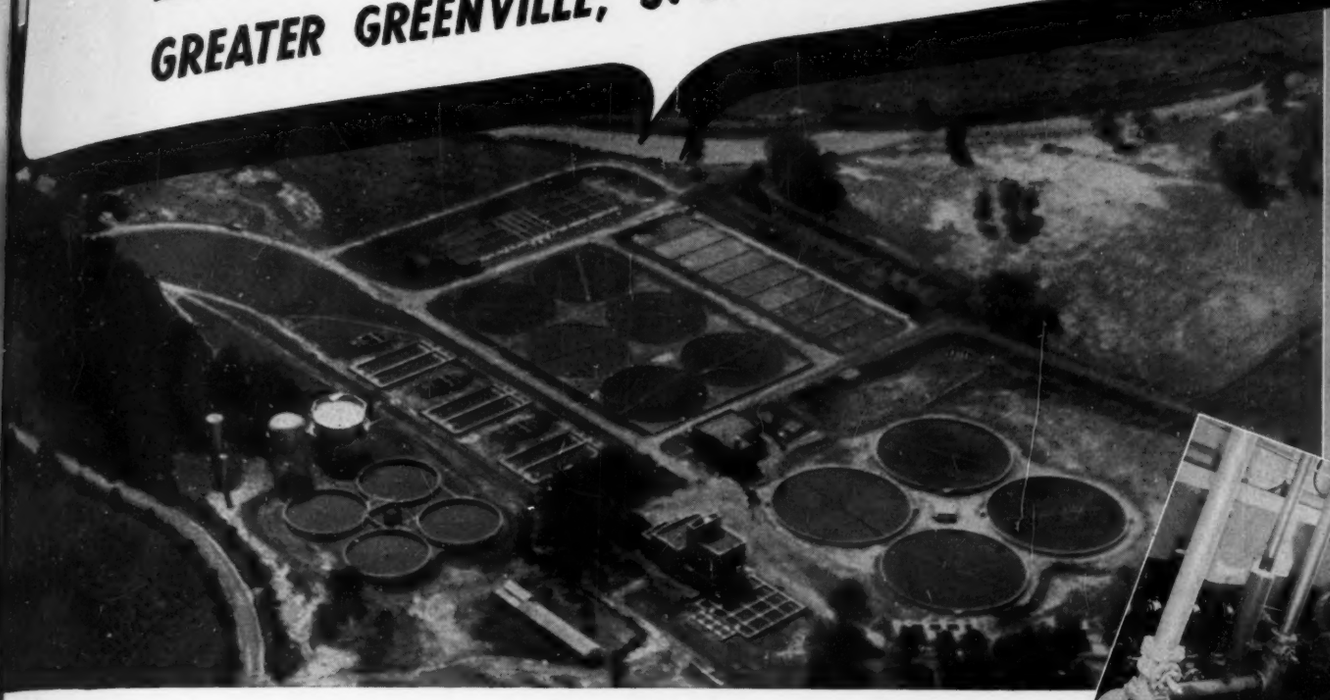
Pioneers in the production of Liquid Chlorine, EBG engineers have long years of experience in its manufacture and servicing. Let their experience work to *your* advantage — specify EBG Liquid Chlorine when you buy.

ELECTRO BLEACHING GAS COMPANY
Main Office: 60 East 42nd Street, New York, N.Y.
Plant: Niagara Falls, N.Y.

EBG Liquid Chlorine
FIRST IN THE COUNTRY

Nordstrom Valves—EMCO Meters *selected for*

GREATER GREENVILLE, S. C. SEWAGE DISPOSAL PLANT



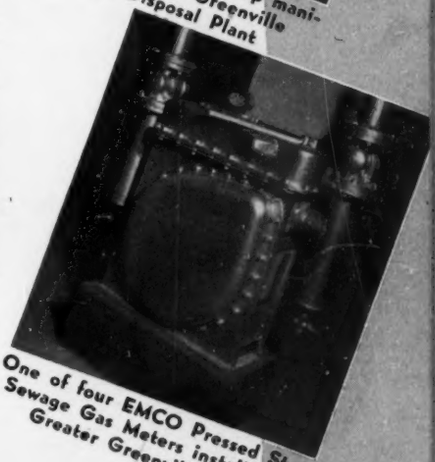
THE new Greater Greenville Sewage Disposal Plant, a model of its kind, is one of the finest in the Southeastern United States. Designed to function with the greatest efficiency and utmost dependability, the equipment specified was chosen for its ability to maintain the high standards that the designers so carefully wrote into the plans.

It is noteworthy that Nordstrom Valves and EMCO Meters were selected by the engineers, J. E. Sirrine & Company.

Accurate measurement of all gas generated is assured through the use of EMCO Pressed Steel Meters which operate by the positive diaphragm displacement method. Due to their compact design, they require less floor space than any other meter of the same rated capacity. Their sturdy construction is a safety factor important in a plant of this character.

Nordstrom Lubricated Plug Valves were specified due to their resistance to leakage and the fact that they always open or close easily. Their basic construction makes them inherently resistant to corrosion and erosion. In sewage disposal plants everywhere Nordstroms have proven that they will outlive the average valve several times over.

Nordstrom Valves on pump manifolds in Greater Greenville Sewage Disposal Plant



One of four EMCO Pressed Steel Sewage Gas Meters installed in Greater Greenville Plant

Write, Asking for Bulletins 1031 and 1042.

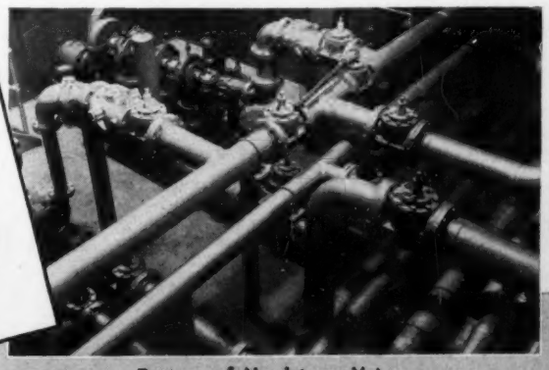
PITTSBURGH EQUITABLE METER COMPANY
MERCO NORDSTROM VALVE CO.

NEW YORK · BUFFALO · PHILADELPHIA · KANSAS CITY · TULSA · LOS ANGELES — *Main Offices* - PITTSBURGH, PA. — DES MOINES · CHICAGO · COLUMBIA · MEMPHIS · OAKLAND · HOUSTON

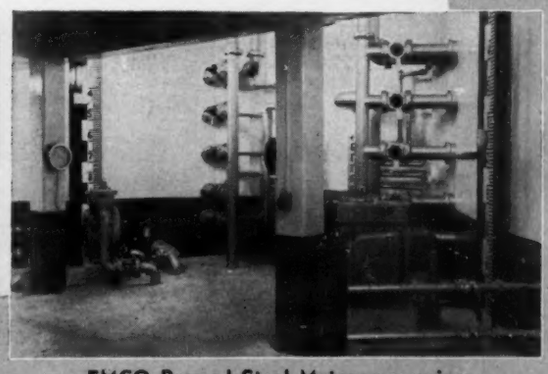
Use PITTSBURGH HOT AND COLD WATER METERS

To measure heated water circulated through digestion tanks.

To measure cold water for various uses about the disposal plant.



Battery of Nordstrom Valves in pit at Greater Greenville



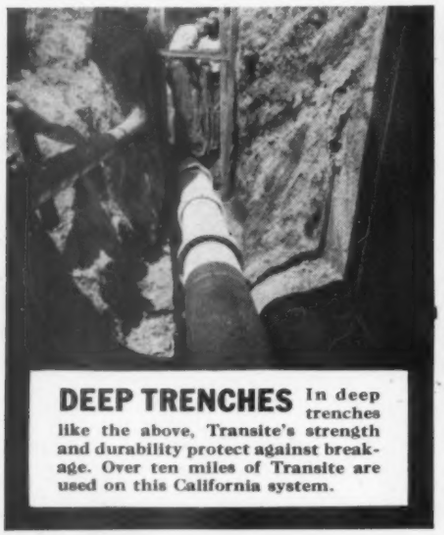
EMCO Pressed Steel Meters measuring sewage gas on Nordstrom Valve controlled

INSTALLATION COSTS A simple, easily operated chain puller is the only tool needed for assembly of Simplex Couplings. Unskilled crews can lay Transite rapidly and economically, as fast as the trench is opened. Job shown here is in Washington State.

HANDLING COSTS Transite's long, light lengths keep handling costs low. Smaller trucks carry more footage; loading and unloading is faster, easier. More than 16,000 feet of Transite are used on this Pennsylvania line.

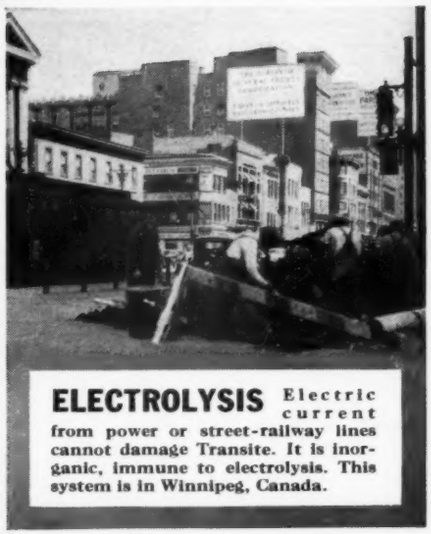
Which of These Problems Will You Meet Next?

CORROSIVE SOILS Corrosion has little effect on Transite's asbestos-cement structure. Even in unusually acid or alkaline soils, it assures minimum upkeep costs. Above line is part of a 9,000-foot Texas system.



DEEP TRENCHES In deep trenches like the above, Transite's strength and durability protect against breakage. Over ten miles of Transite are used on this California system.

WIDE SWEEPS Flexibility of Simplex Couplings permits wide sweeps to be made with straight lengths of Transite. No special fittings are needed, joints stay tight. Above job in Maine.

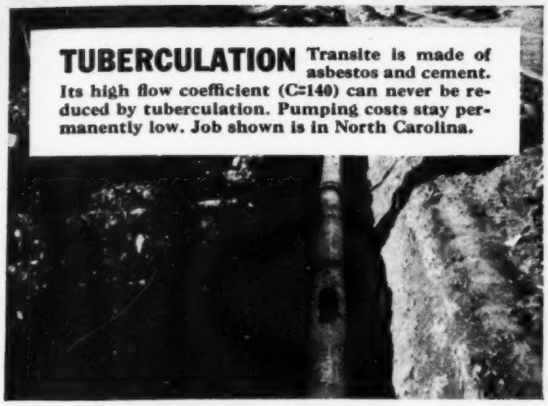


ELECTROLYSIS Electric current from power or street-railway lines cannot damage Transite. It is inorganic, immune to electrolysis. This system is in Winnipeg, Canada.

JOHNS-MANVILLE JM PRODUCTS

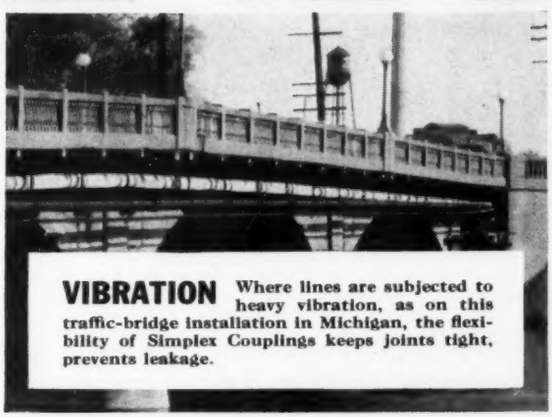
Johns-Manville TRANSITE

WET TRENCHES Assembled cold, Simplex Couplings require no costly heating equipment on the job. Work goes rapidly, even in wet trenches such as those encountered on this New York State job.



TUBERCULATION Transite is made of asbestos and cement. Its high flow coefficient (C=140) can never be reduced by tuberculation. Pumping costs stay permanently low. Job shown is in North Carolina.

JOINT LEAKAGE Simplex Couplings form bottle-tight joints that stay tight as long as the line is used . . . give positive protection against water losses due to joint leakage. This line is in Arizona.



VIBRATION Where lines are subjected to heavy vibration, as on this traffic-bridge installation in Michigan, the flexibility of Simplex Couplings keeps joints tight, prevents leakage.

TRANSITE HELPS SOLVE THEM ALL!

SOONER OR LATER, you're going to run into one—probably several—of these conditions on your water systems. How *economically* you meet them depends largely on the pipe you specify. That's why you should have all the facts on J-M Transite Pipe.

This asbestos-cement water carrier combines every advantage necessary for long, economical water-carrying service. Strong and durable, it is exceptionally resistant to soil corrosion, immune to electrolysis. Being non-metallic, Transite cannot tuberculate—its high delivery capacity (C = 140) can never be reduced by this costly economic evil. Bottle-tight Simplex Couplings eliminate joint leakage. And, because of its long lengths, light weight and speed of assembly, the installed cost of Transite Pipe is surprisingly low.

Hundreds of municipalities all over the country are keeping water-transportation costs to a minimum with J-M Transite Pipe, and more than 10 miles of this durable, asbestos-cement water carrier have been installed in the grounds of the New York World's Fair. For details on the 25-year service record back of J-M Transite Pipe, write for brochure TR-11A. And, for new ideas on efficient, economical sewerage systems, ask for the Transite Sewer Pipe brochure, TR-21A. Johns-Manville, 22 East 40th Street, New York, N. Y.

PIPE *An Asbestos Product*

THE MODERN MATERIAL FOR WATER AND SEWER LINES

HOW DOES AN AERO-FILTER GIVE *MORE FOR LESS MONEY?*

THIS CONSULTING ENGINEER ASKED ME*

***THE REX MAN**

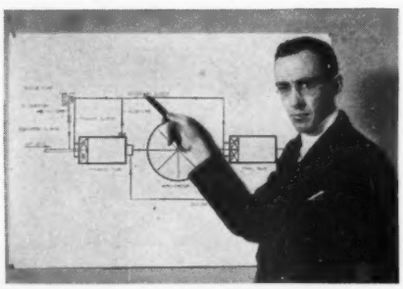
AND I GAVE HIM THESE STARTLING FACTS!

① LOWER INITIAL COST! Yes, the cost is lower with an Aero-Filter because the filter bed volume is only 1/7 to 1/9 that of conventional filters! This is made possible by Aero-Filter's efficient distribution of sewage to the filter bed. And another thing—

② OPERATING COST IS LOWER, TOO, because the need for costly pumping for recirculation is eliminated by Aero-Filter's distribution. Thus, maintenance and power costs are proportionately lowered, and of course fixed-charge items are lower because of the low initial plant cost.

③ ADEQUATE PURIFICATION for any of your requirements is the third reason. By a choice of a single or two-stage design and supplementary units, any degree of effluent quality may be obtained! All this—at minimum cost for plant and operation! Think *that* one over!

④ AND A PROVED BACKGROUND is something you should consider. Aero-Filter is thoroughly proved. Its basic design factors have been established and approved by state boards of health. There are 49 Aero-Filter installations in 13 states —in both Northern and Southern climates!



⑤ AERO-FILTER SLUDGE. Your Aero-Filter sludge can be concentrated in the primary tank: you can combine it with the primary sludge before pumping it to digesters. This reduces sludge pumping to a minimum, with correspondingly reduced heat loss and less supernatant solids discharge.

⑥ AND DON'T FORGET, Rex sanitation equipment includes other proved equipment: Bar screens, triturators, grit collectors and washers, conveyor and Tow-Bro sludge collectors, rapid and Slo-mixers—a complete line, from an established and experienced source.

P.S. *This imaginary conversation is typical of those held every day between the Rex Man and men in your capacity. If you are interested in sewage treatment, send for catalogs on the complete line of Rex sanitation equipment. Address 1610 West Bruce Street, Milwaukee, Wisconsin.*

REX SANITATION EQUIPMENT

CHAIN BELT COMPANY OF MILWAUKEE

Baldwin-Duckworth Chain Belt Division, Springfield, Massachusetts • Worcester, Massachusetts
Rex Chain Belt and Conveyor Divisions, Milwaukee, Wisconsin

50TH ANNIVERSARY 1891 REX 1941 CHAIN BELT COMPANY

This Advertisement Carries a Coupon —and Here's Why

FILTER ALUMS

STANDARD ACTIVATED ALUM

is a very powerful water works coagulant, recognized as the coagulant to use when dealing with waters which are difficult to handle—*fast being recognized as America's most popular coagulant.*

DUSTLESS BLACKALUM

is the only coagulant manufactured containing powdered activated carbon. This coagulant is recognized as the most efficient available for water works practice, *because it will actually remove tastes and odors from water supplies.* It is made from Standard Activated Alum and costs $2 per ton more because of its activated carbon content. Truly the "Alum of Tomorrow available Today" for those who demand the best in Everything.

TYPICAL CROSS-SECTION OF USERS:

NORFOLK, VA.	TRENTON, N. J.
BUFFALO, N. Y.	RALEIGH, N. C.
CUMBERLAND, MD.	RICHMOND, VA.
NEWPORT NEWS, VA.	WASH. SAN. SUB. DIST.
WASHINGTON, D. C.	BELOIT, KANS.
COLUMBIA, S. C.	TUSCALOOSA, ALA.
CHARLOTTE, N. C.	GREENSBORO, N. C.

AN INQUIRY WILL BRING FULL FACTS—NO OBLIGATION

POWDERED ACTIVATED CARBON

Our activated carbon is the **highest quality available** —produced by the most modern plant in the industry —the last one built.

TYPICAL CROSS-SECTION OF USERS:

Buffalo, N. Y.	Albany, N. Y.
Trenton, N. J.	Cincinnati, O.
Baltimore, Md.	Charlotte, N. C.
Richmond, Va.	Niagara Falls, N. Y.

WASHINGTON SUBURBAN SANITARY DISTRICT
FEDERAL WATER SERVICE CHAIN OF PLANTS
AMERICAN WATER WORKS AND ELECTRIC COMPANY.
ETC.

Let us save you *some real money* on your next activated carbon requirements.

BLEACHING CLAY

—Aids coagulation
—Increases absorption of organic matter
—Costs less than $20 per ton on the average
• Where absorption is indicated, bleaching clay is the answer.

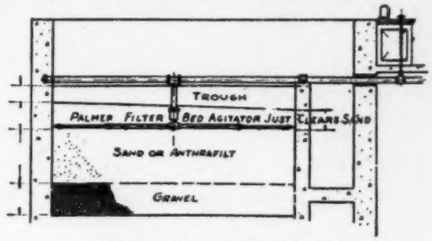
USED BY SUCH CITIES AS:

Atlanta, Ga.	Red Lion, Pa.
Chester, Pa.	Albemarle, N. C.
Hamlet, N. C.	Boonville, Mo.
Thomasville, Ga.	Ecusta Paper Company, N. C.

SURFACE WASH

PALMER FILTER BED AGITATORS

Developed at Erie, Pa., by C. E. Palmer—awarded the President's Cup for outstanding performance—praised by editors and engineers alike—the latest thing in



Palmer filter bed agitator

water works practice—28 new installations in January. Over 400 now in service.

USERS REPORT

- complete elimination of mud balls
- no more cracking or shrinking of beds
- less wash water required—averaging 40% reduction
- sand is clean—like new sand, after about three weeks' operation
- longer filter runs
- better tasting water—because the filter sand is really clean
- reduction of chlorine demand in filtered water—because of removal of organic matter in the filter sand

USED BY SUCH CITIES AS:

Buffalo, N. Y.	Chester, Pa.	Newport News, Va.
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Akron, O.	Columbus, O.	Concord, N. C.
Charlotte, N. C.	Erie, Pa.	Aberdeen Proving
Appleton, Wisc.	Beaver Falls, Pa.	Grounds, Md.
Allentown, Pa.	Fayetteville, N. C.	Fort Belvoir, Va.
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American Enka Corp. Enka, N. C.	Hammermill Paper Co. Erie, Pa.
Del-Mar-Va Power Co. Vienna, Md.	Nekoosa Edwards Paper Co. Port Edward, Wisc.
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Name .....

Title .....

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HTH *Saves the Day!*

With Emergency Chlorination Job For Rochester, N. Y.

Street flushing tank preparing HTH solution to be injected into hydrants by auxiliary pumper.

Wm. H. Roberts, Commissioner of Public Works, Rochester, N. Y. writes—

"Following the accidental introduction of impure river water into our city drinking water mains on December 10th and 11th, we discovered the contamination was so widespread that regular chlorination at our reservoirs would take considerable time.

"We made direct injections of HTH solutions into the mains at many points of the City by using our regular equipment. Each crew consisted of a street flushing tank and an auxiliary pumper.

"Five pounds of HTH were added to each 2,500-gallon tank of water and pumped back into the mains through the fire hydrants.

"We believe this method of chlorination with HTH solutions enabled us to save two weeks time in purifying our drinking water system."

● River water (four million gallons of it!) accidentally enters the drinking water system at Rochester, N. Y. Liquid chlorine is added at the reservoirs but does not reach the dead ends of a drinking water system with 500 miles of mains. It is decided to use hypo-chlorination to speed up purification of the drinking water, and an emergency shipment of Sanitation HTH is rushed to the scene.

Flushing trucks of 2,500-gallon capacity speed to hydrants at strategic points in the city and auxiliary pumpers inject solutions of HTH into the hydrants. The solution is approximately 168 p.p.m. available chlorine. The operation is started about 4:30 P.M. December 15, and on the evening of the second day the drinking water is declared pure. Says Wm. H. Roberts, Commissioner of Public Works, Rochester —*"We believe this method of chlorination with HTH solutions enabled us to save two weeks time . . ."*

Once again—HTH saves the day—proves its value as a standby source of chlorine. Proves why hundreds of water works throughout the country rely on Sanitation HTH not only for quick, efficient service when emergencies arise but also for many everyday sanitation jobs. Be Prepared With Mathieson HTH. It contains 70% available chlorine, is quick acting, easily soluble, easily transported. Write or wire for full information and your nearest source of supply.

HTH comes in 5-lb. cans with replaceable caps, packed 9 cans to the case; also in 100-lb. drums.

THE Mathieson Alkali Works (INC)

60 EAST 42ND STREET, NEW YORK, N. Y.

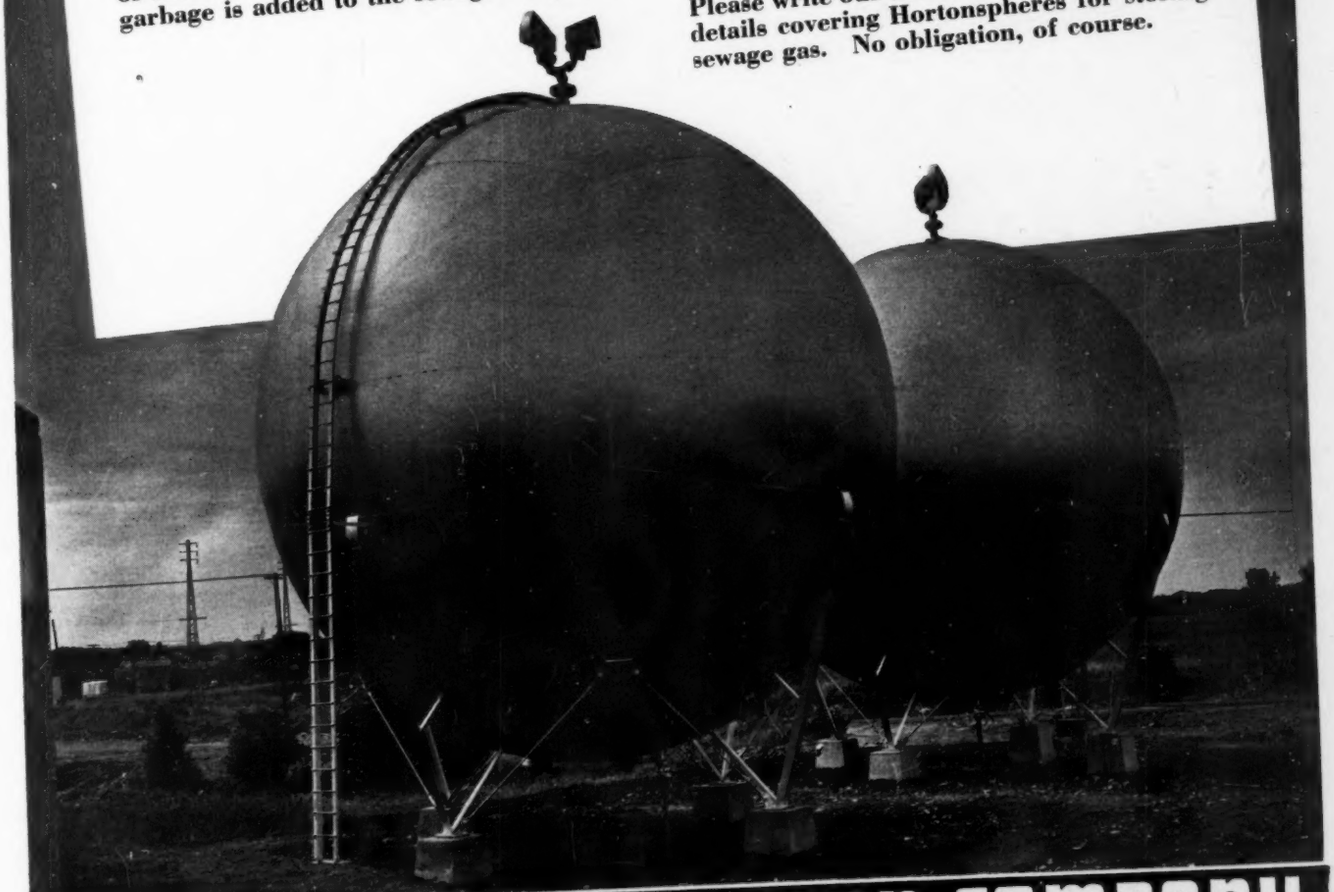
LIQUID CHLORINE . . . HTH . . . SODA ASH . . . CAUSTIC SODA . . . BLEACHING POWDER . . . BICARBONATE OF SODA . . . AMMONIA, ANHYDROUS and AQUA . . . PH-PLUS (FUSED ALKALI) . . . DRY ICE . . . CARBONIC GAS

2 HORTONSPHERES

used at the Rock Island sewage plant for HEAT and POWER requirements

A new sewage disposal plant has been completed recently at Rock Island, Ill., which included the installation of new storm and intercepting sewers, pumping equipment, a sewage and garbage treatment plant and incinerators for refuse and sewage sludge. Seven gas engine-driven pumps and four electric pumps are employed; the gas engines providing power for all pumping, the electric units being used for stand-by service.

The digestion process produces 1 cu. ft. or more per capita of 650 Btu gas. Ground garbage is added to the sewage sludge as a means of disposal and to increase the gas output. The two Hortonspheres shown below provide an adequate reserve of gas to supply the heavy pumping demands during storms. They have a capacity of 50,000 cu. ft. each and operate at 50 lbs. per sq. in. pressure. This utilization of gas makes the plant self sufficient as far as normal heat and power needs are concerned. A small gas engine generating unit furnishes electricity for lighting and other electrical equipment. Incinerators will operate on gas, while the digesters are kept at 85 deg. and the buildings heated by engine cooling water or gas burning units. Please write our nearest office for complete details covering Hortonspheres for storing sewage gas. No obligation, of course.



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Cleveland	2262 Builder's Exchange	Houston	918 Richmond Avenue	San Francisco	1083 Rialto Bldg.
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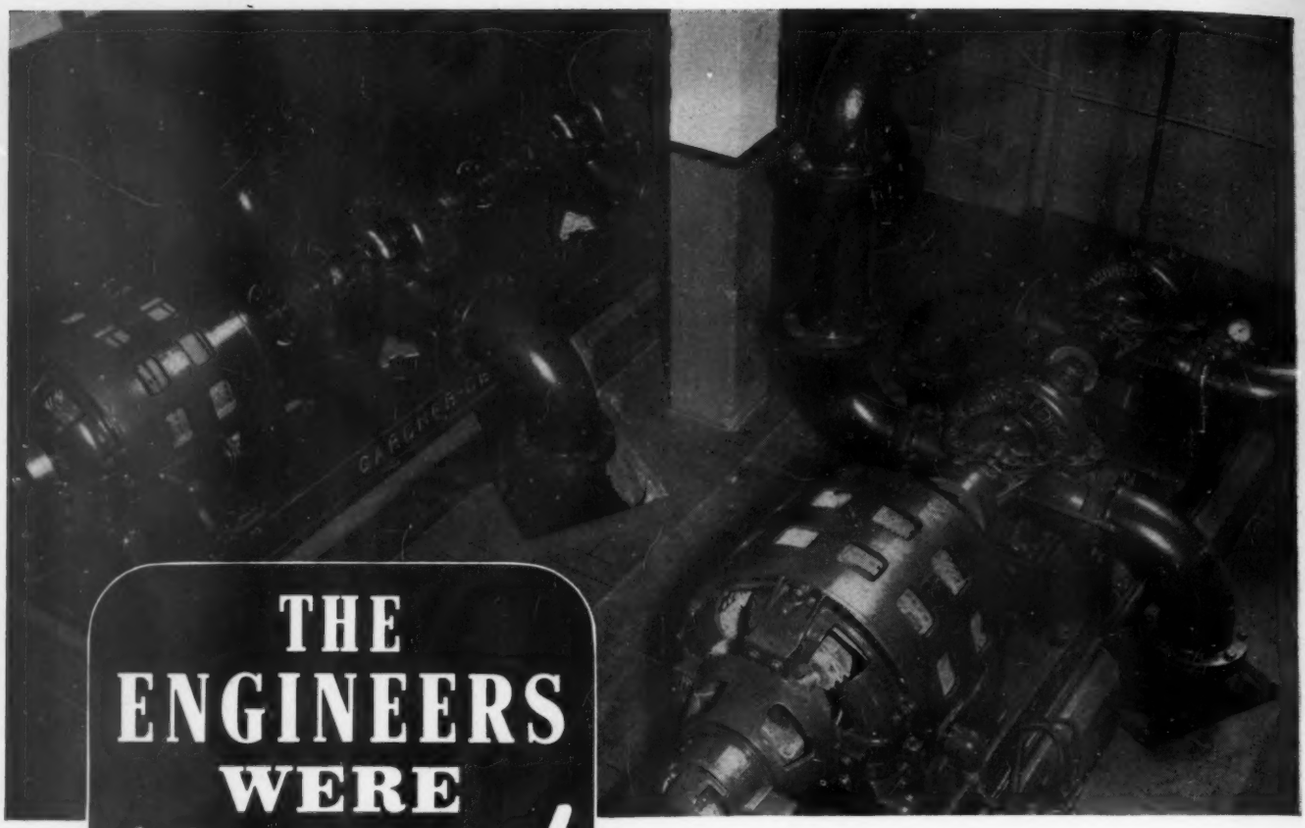
Plants at BIRMINGHAM, CHICAGO, and GREENVILLE, PA. *In Canada:* HORTON STEEL WORKS, LIMITED, FORT ERIE, ONT.



THE ENGINEERS WERE "from Missouri!"

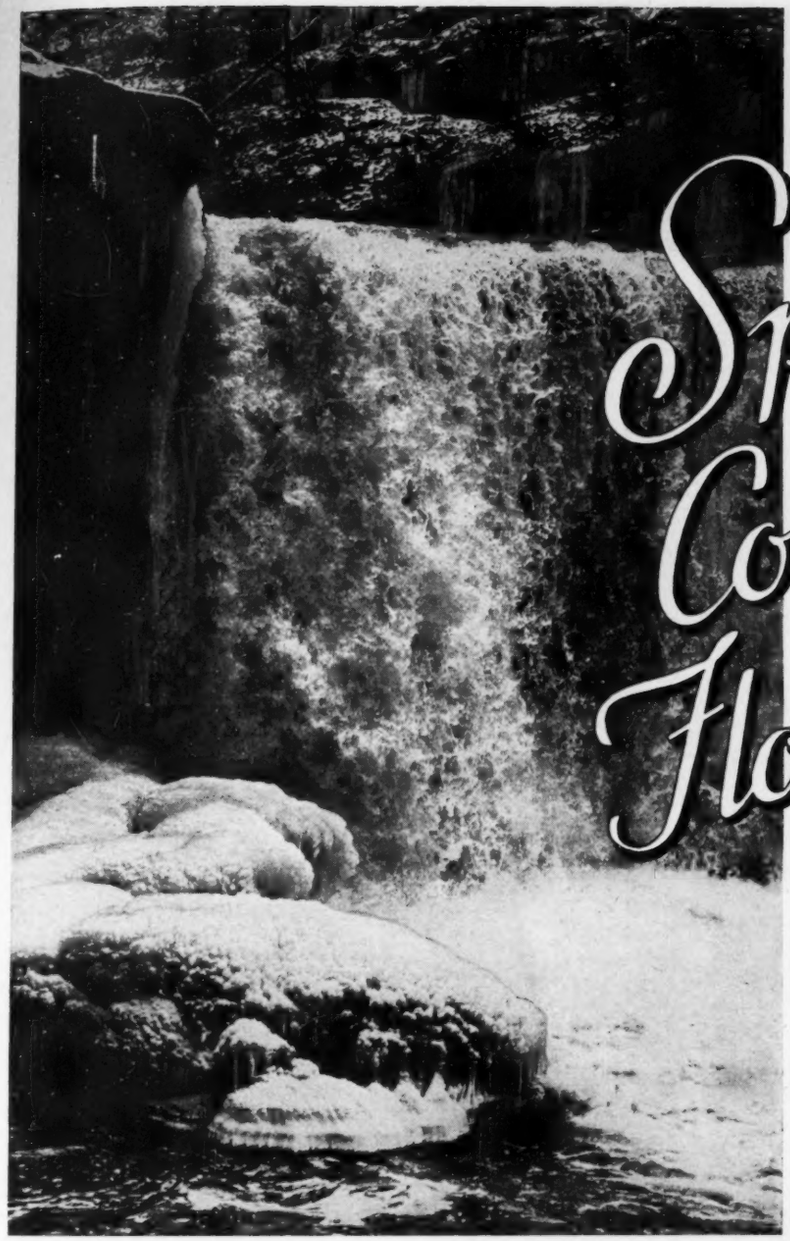
Installed in a midwestern municipal water works, these Gardner-Denver Type F Horizontally Split Case Centrifugal Pumps are working 12 to 14 hours per day, 7 days a week. These Gardner-Denver pumps replaced obsolete steam-driven units over a year ago, and since then no maintenance expense whatsoever has been necessary.

"SHOW US!" said the water works engineers of a midwestern city when efficiency figures for Gardner-Denver Type F Centrifugal Pumps were given in our quotation. From their long experience, they knew it would take a mighty good centrifugal pump to meet those figures.

When the pumps were installed, they were subjected to rigid tests by the engineers. Careful observation showed that the rated efficiencies were met—*and even exceeded.* Now these engineers join in the country-wide praise of Gardner-Denver centrifugal pumps.

What is behind this praise? Higher efficiency at lower costs—modern hydraulic design—improved mechanical advantages—all contribute to the ability of Gardner-Denver centrifugal pumps to reduce cost per 1000 gallons pumped. Learn how these pumps can save money for YOU. For complete specifications write Gardner-Denver Company, Quincy, Illinois.

GARDNER-DENVER SINCE 1859



Speed up Cold Water Flocculation with STANDARD SILICATE OF SODA

Cold weather brings minimum water temperatures and maximum water density. The result is slow floc formation and settling. The use of Standard Silicate of Soda will aid in the correction of both conditions by speeding up the reaction and producing a larger, denser floc. As a result, longer filter runs are possible and substantial savings can be effected in chemical consumption.

Let our technical staff help you adapt this process to your plant!

DIAMOND ALKALI COMPANY • Standard Silicate Division

General Offices
PITTSBURGH, PA.

Plants at
CINCINNATI
JERSEY CITY
LOCKPORT, N. Y.
MARSEILLES, ILL.

TEAR OFF AND MAIL

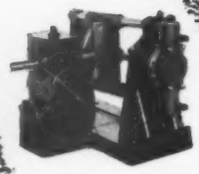
Standard Silicate Division, Diamond Alkali Company,
Oliver Building, Pittsburgh, Pa.

Our water supply has the following characteristics:.....Million Gallons per Day
Average Turbidity..... Present Dosage.....gr./gal. Coagulant.....
We would be glad to receive further information on the use of Standard Silicate.

NAME.....TITLE.....

WATER WORKS.....CITY.....STATE.....

DID YOU SAY *PROGRESS?*



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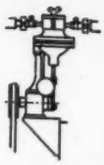

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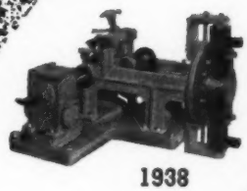

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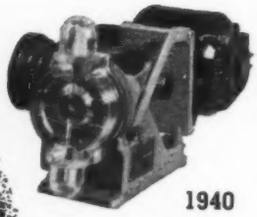

1940

1940

Our hats are off to the Engineers—those who design and those who operate—PROGRESS in the sewage field during the past few years merits real enthusiasm.

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155 East 44th Street, New York, N. Y.
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COMING!

"Rutherford's New Treatment Works"
Is a description of a plant of unusually flexible design and modern in every quarter. This plant, with control features of unusual interest, was designed for highly variable loadings permitted by a selection of combinations of chemical pretreatment and high or low rate trickling filters. The future indeterminable loading of industrial sewages lead to design of a plant thought to be capable of coping with such loadings under all conditions imposed. The final effluent is polished off by mechanical filtration and the dewatered sludge is incinerated. The article stresses the unusual and most interesting features of design and operation. The authors—
CHAS. J. KUPPER, Designing Engineer, New Market, N. J.
and
A. B. KOZMA, Plant Superintendent, Rutherford, N. J.

"Corrosion Control at Sewage Treatment Works"
Is the story of how pitting and destructive electrolytic, or galvanic, corrosion of metal parts within sludge digestion tanks of a Los Angeles treatment plant was studied and corrected by application of the Cathodic method of metal protection. First applied to pipe lines, then steel water tanks, and now to sewage works structures, this story of Cathodic protection constitutes an interesting and valuable contribution to the literature. We greatly regret that the article, planned for his issue, must be held over for March. The author—
GEORGE A. PARKES, Assistant Engineer, Bureau of Sewers, Los Angeles

"Water Hammer Corrections"
Is an article which discusses methods and equipment available on the market for most successfully correcting the disturbing and destructive pipe line surge or water-hammer. Included is a highly useful section devoted to shock absorbing devices found effective as water hammer suppressors for small pipe lines and consumers piping systems. The author—
RICHARD BENNETT, Hydraulic Engineer, City Engineer's Office, Phoenix, Ariz.

"An Adjucator of Many Water Works Problems"
Is the sub-caption of an article which should sell many a flow recording "Meter-Master." This story is the most replete of any ever written, in disclosing the variety of applications of this information revealing water works instrument. What its revelations have meant in dollars and cents to a Water Department, as the result of more correct metering, compound meter shunting, checking pump efficiency, etc., is told by—
D. R. ("Doc") TAYLOR, Plant Superintendent, Roanoke, Va.

"Anhydrous Ammonia"
Is a companion article to one on Liquid Chlorine which appears in our Reference and Data Numbers for 1938 and 1939. The forthcoming article, secured at the suggestion of users of the Reference issues, will give the properties of compressed anhydrous ammonia gas supplied in steel cylinders. And, like the Liquid Chlorine article, it will suggest and describe methods of safe handling and application of Anhydrous Ammonia, give first aid procedures and other pertinent information of value to ammonia users. The author—
ROBERT J. QUINN, and RALPH L. CARR, The Mathieson Alkali Works, New York, N. Y.

"America's Softening Plants of Special Interest"
Are briefly described, pictured and commented upon in respect to features of particular interest. The forthcoming article is a follow-up of the first on the same topic which appeared in our November, 1940, issue. The two articles cover 19 plants visited by the author in a coast-to-coast tour, for the purpose of investigating and evaluating modern softening practices, plant design and equipment. The author—
L. J. ALEXANDER, Engr. of Operations, Southern California Water Co., Los Angeles

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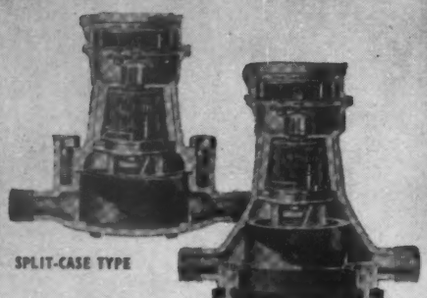

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WATER WORKS & SEWERAGE

VOL. 88, NO. 2 *A Gillette Publication* FEBRUARY, 1941

DEVELOPMENTS AND TRENDS IN SEWERAGE PRACTICES

A Review of Progress During the Past Year, with Particular Emphasis on the Treatment of Sewage and Industrial Wastes.

By DR. ABEL WOLMAN[1]
and
ALFRED H. FLETCHER[2]
THE JOHNS HOPKINS UNIVERSITY
BALTIMORE, MARYLAND

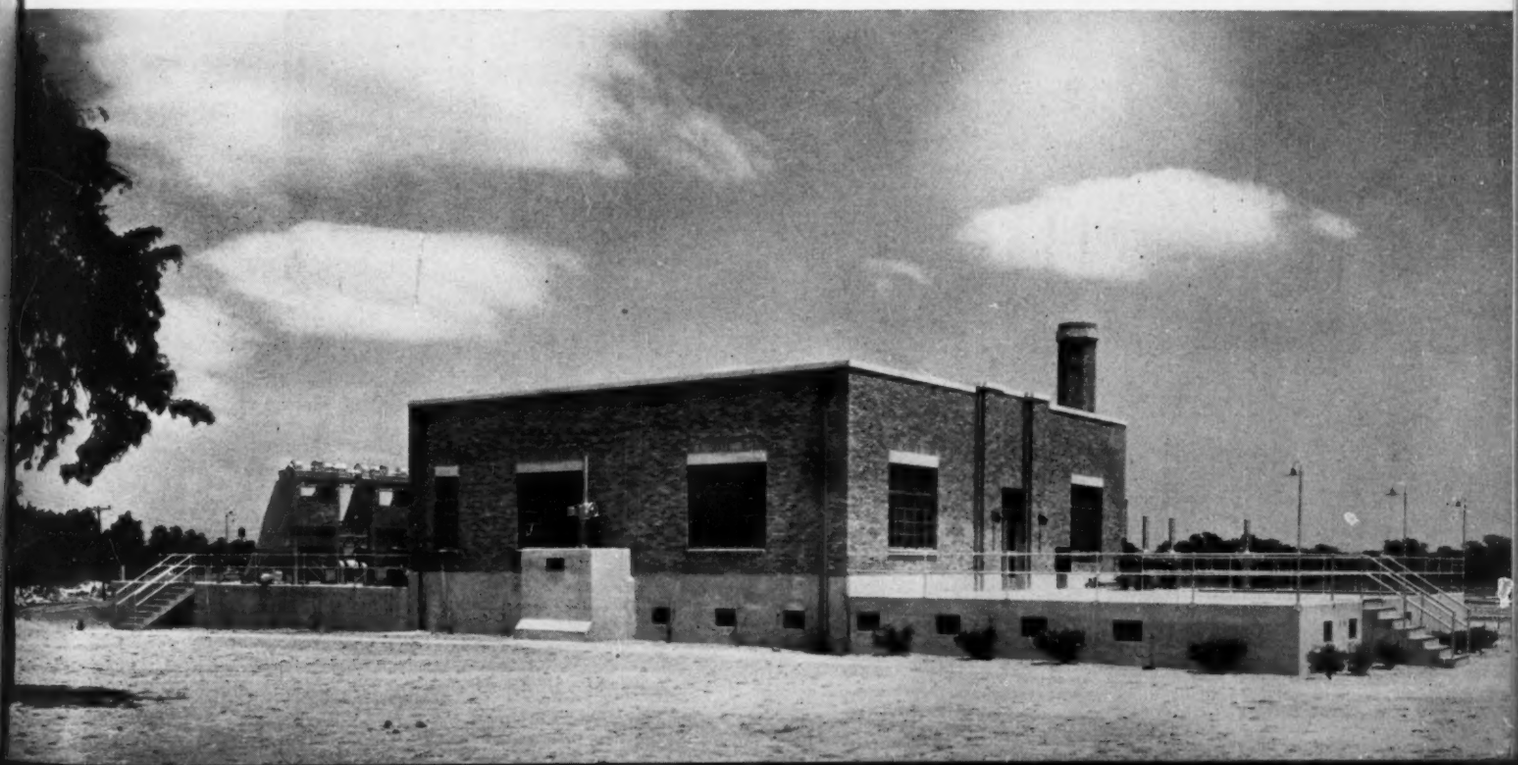
DEVELOPMENTS in the art of treating sewage and industrial wastes have been rapid in recent years. Center feed clarifiers, certain types of flash dryers, the utilization of digester gas, sludge elutriation, mechanical flocculation and high rate filtration all have made their appearance during the past few years. The Public Works Administration program during these same years has, in its stimulation of construction of new plants and improvements and extensions to existing plants, naturally added to research activity and mechanical improvement.

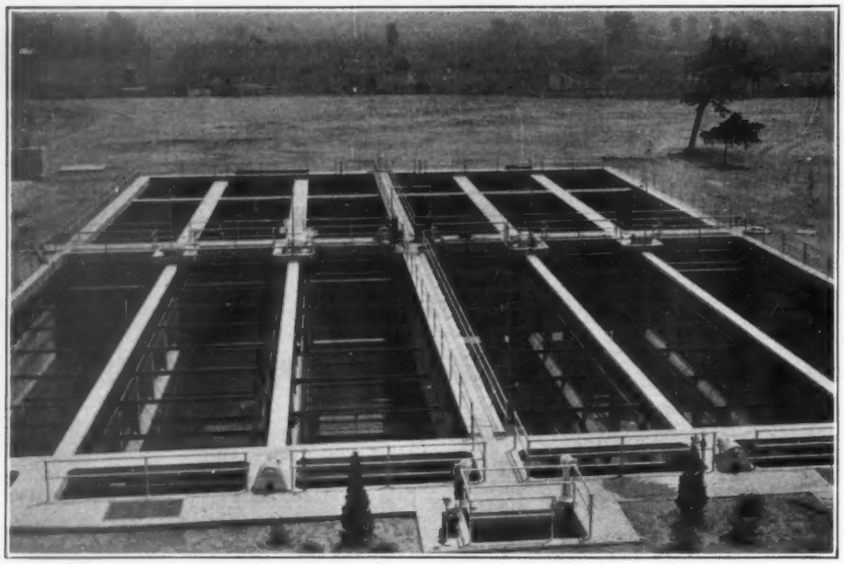
[1] Professor of Sanitary Engineering; [2] Associate.
(Dr. Wolman has just recently been chosen by the Directors of A.W.W.A.—as their nominee—as Vice President of the Association. He also enjoys the distinction of being the immediate past-president of the American Public Health Association, and at present is serving as Chairman of the Executive Board of that Association.—Ed.)

More construction progress toward the abatement of pollution from municipal sources has been achieved during the last seven years than during the preceding twenty-five years. The Public Works Administration lists 121 P.W.A. sewage projects as completed during the year 1940. Approximately one quarter of the total money spent on P.W.A. projects during these years was spent on projects completed in 1940. The P.W.A. financed sewerage projects represent approximately 63.3 percent of all sewerage projects built during this period. The most popular type of treatment used under the P.W.A. program during 1940, as judged by the number of plants, was the trickling filter with pre and post settling. Primary treatment, supplemented by chlorination, was by far the most usual type constructed, however.

The South's Most Important Treatment Plant Goes Into Operation

The main operations building of the new plant of Dallas, Texas, has a capacity of 25 m.g.d. and cost $1,535,000. On left are the Link Belt automatic screens and grit chambers. Beneath the building are the hermetically sealed aeration and aero-chlorinating chambers, in which the screened sewage is deodorized and degreased before seeing daylight.





A Battery of 4 Primary Tanks at Dallas

"Rex" sludge and scum moving flights are drawn toward a central sump across the center, the sewage entering at the center and flowing in opposite directions. The design materially reduces strain on flight chains and drive mechanisms; centralizes operations.

The Ten Largest Projects

Ten of the largest P.W.A. projects completed in 1940, in which the estimated cost exceeded a million dollars and in which the project included treatment plants, are listed as follows:

New Haven, Connecticut, has just completed its Boulevard Sewage Treatment Plant. Practically all New Haven sewage is now treated by plain sedimentation. During the bathing season the effluent is chlorinated.

The Rock Island, Illinois, plant includes primary treatment with digestion of sludge and included provisions for grinding, digesting and incinerating garbage.

The Gary, Indiana, plant, which provides activated sludge treatment, includes provision for grinding garbage and digestion with sludge. Gas recovery and utilization as the principal source of power became an important factor in the choice of dual disposal of garbage and sewage in a single plant.

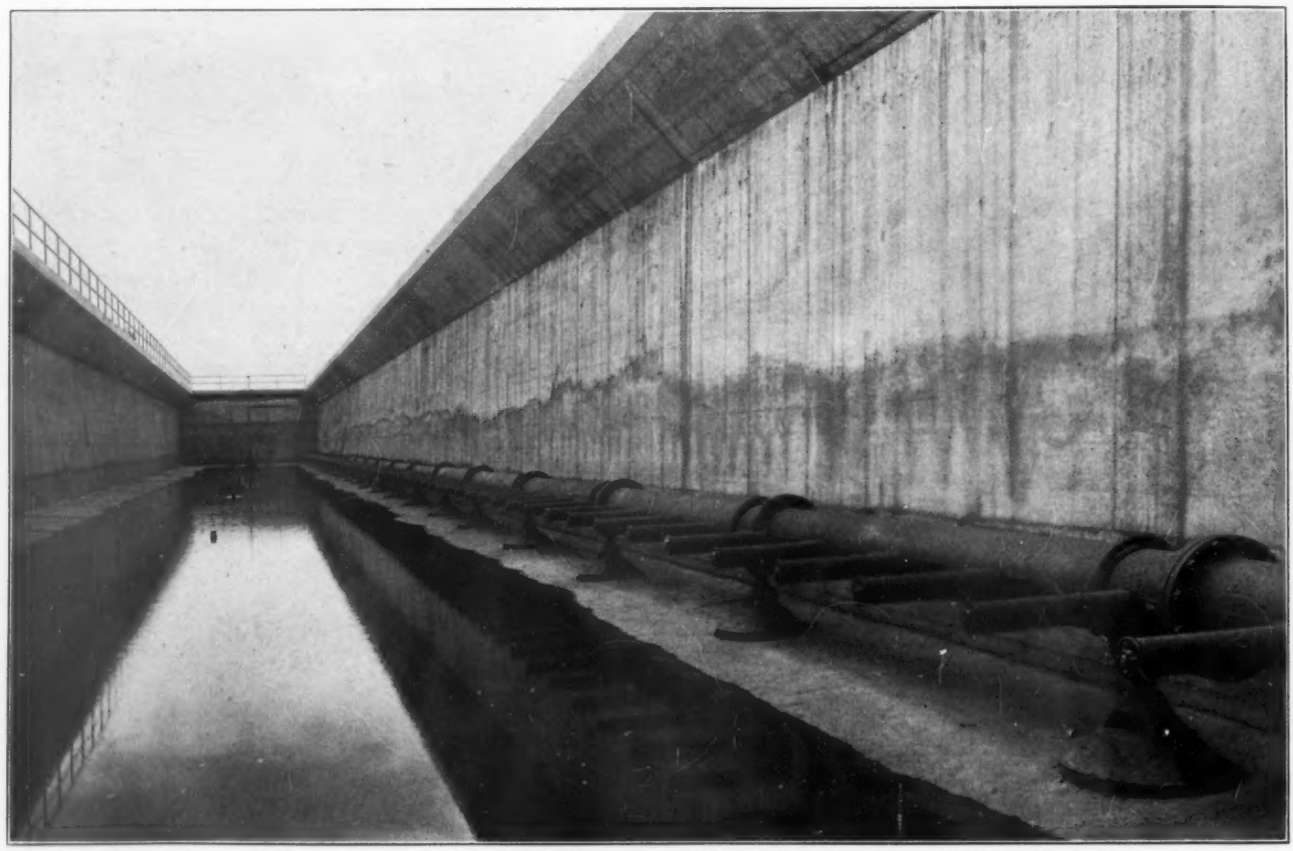
In Metairie, Louisiana, a complete new sewerage system was constructed and the treatment consists of clarification, trickling filters with digestion tanks and drying beds for the sludge.

The Washington Suburban Sanitary District in Prince George's and Montgomery Counties, Maryland, spent over a million dollars for a sewerage system including a treatment plant with primary sedimentation and chlorination.

Two primary treatment plants with intercepting sewers were built in Springfield, Massachusetts, at a cost of approximately three million dollars.

Detroit, Michigan, spent over twenty-two million dollars for sewers and for primary treatment, supplemented by chlorination, and sludge incineration. This plant boasts the world's largest chlorination plant and sludge incinerator installation.

Bergen County, New Jersey, spent over a million



One of the Gary, Indiana, Aeration Tanks

Reveals the method of air distribution from a C. I. manifold into which are screwed readily replacable "Aloxite" diffuser tubes. On the opposite side of the manifold are an equal number of tubes staggered with those visible.

dollars for trickling filters with clarifiers preceding and following the filters and with sludge digestion and gas utilization.

The Dallas, Texas, plant incorporates trickling filter treatment, with settling before and after filtration, and complete odor control and separation of grease at the inlet end of the plant.

Wausaw, Wisconsin, provided preliminary treatment and extensions to the sewer system at a cost of $1,350,000.

Under the work relief projects of the Works Progress Administration 639 new sewage treatment plants, improvements to 339 and additions to 43 more were completed during the five year period ending June, 1940. The new plants were designed to treat a total of 361,500,000 gallons of sewage per day. Approximately 18,000 miles of storm and sanitary sewers were also completed as W.P.A. projects.

Under the W.P.A. program many thousands of sanitary pit privies have been installed this year at rural homes and in unsewered communities. From 1935 to June 1940, a period of five years, approximately two million sanitary pit privies of the concrete-slab type have been completed and 34,000 repaired.

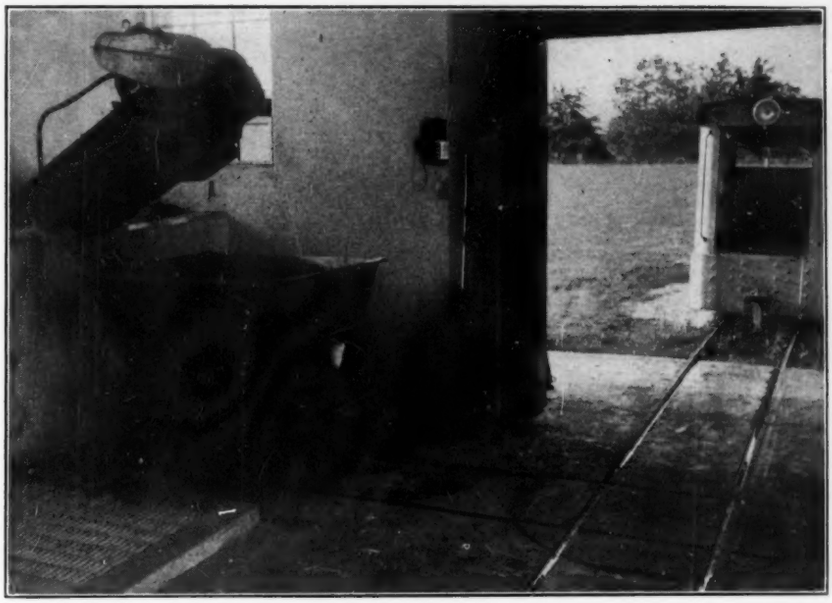
A National Sewage Works Federation

Perhaps the most significant and certainly the most interesting development in the sewage works field during 1940 was the first annual national convention of the Sewage Works Federation which was held in Chicago, October 3 to 5. In addition to the fact that the program included outstanding papers covering the field of sewage and industrial waste treatment, steps were taken at a business meeting and at a special meeting of the Board of Control of the Federation leading to its reorganization and expansion. By the time this review is published the revised constitution and by-laws will have been adopted at the January, 1941, meeting in New York City. As expressed by F. W. Mohlman, the first annual convention was a success "technically, socially and financially."

There are 25 district Sewage Works Associations affiliated with the Federation, two in England, one in Canada, one in Argentina and twenty-one in the United States. During 1940 membership and interest in the Federation have increased greatly.

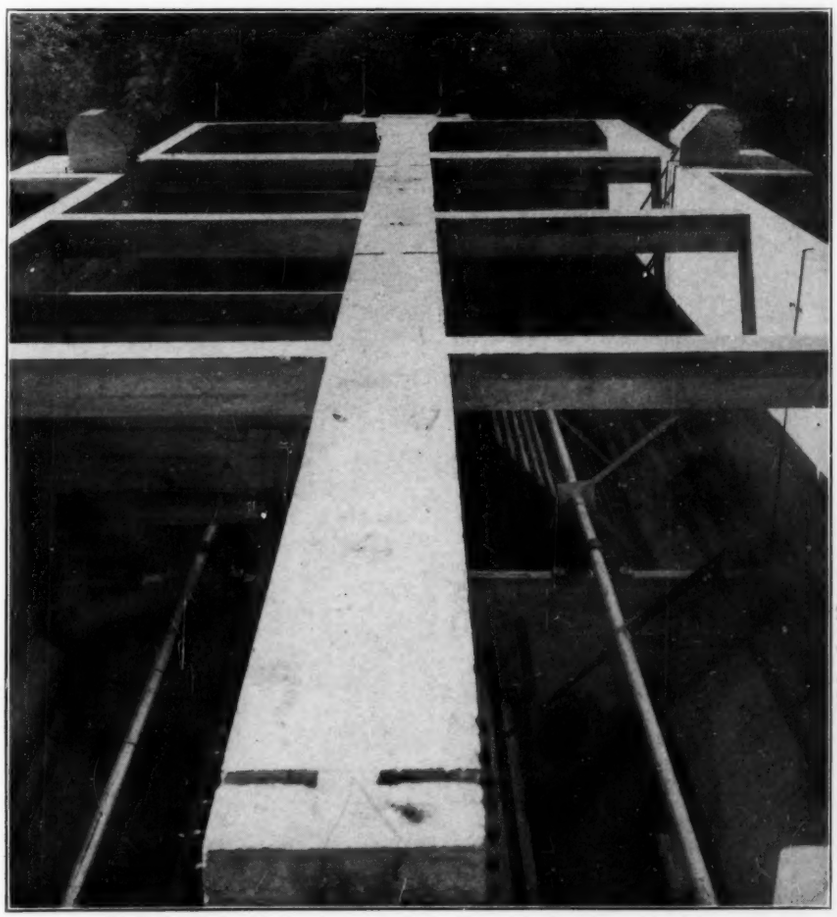
Screening

The trend, as in all types of treatment, has been toward mechanizing the operation. Comminutors are being used extensively, while screens and shredders appear to be favorably thought of for the larger plants in particular. The ability to hoist the entire bar screen



Gary's Grit

An important consideration in Gary's Dual Disposal Plant is GRIT. The screw of the Link Belt Grit Washer delivers trouble making grit, glass, bottle caps and other metal parts removed from the sewage carrying ground garbage. The husky little Brookville "mule" (locomotive) handles sludge cars as well as the grit.

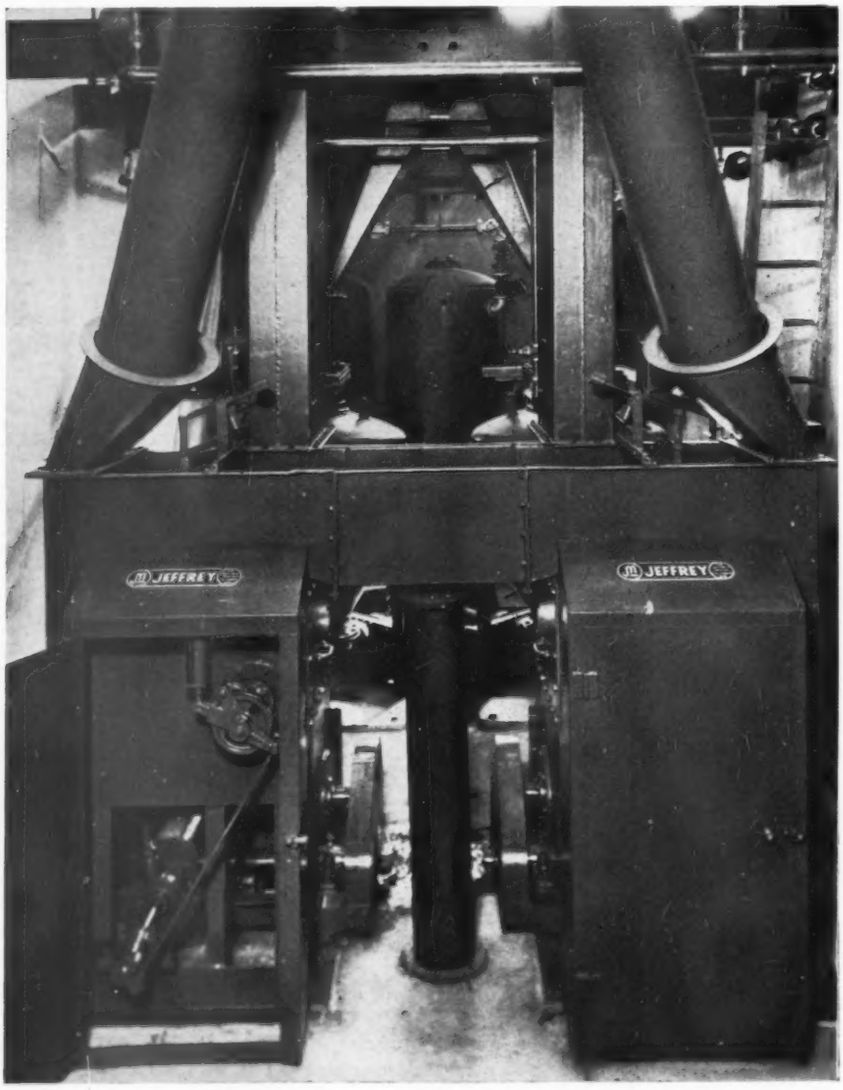


The Jeffrey "Floctrol"—1940 Model

Is a longitudinal flow sectionally baffled flocculation unit, the design of which was further improved in 1940. This particular installation handles an industrial waste.

The 9MGD "Clariflocculator" of Bakersfield, Calif.

Is an interesting unit which puts the "core" of the 100 ft. diameter center-feed clarifier to good use as a mechanical flocculation chamber, while at the same time promoting uniformly distributed flow and minimum of short-circuiting in the annular clarification section. 1940 saw a number of flocculator installations for use with or without chemicals as conditions dictate.



"The "Jigrit" Is a New Type of Grit Washer

This twin installation serves the new Bowery Bay plant of New York City; operates on the principle of a classifying ore jig with automatic wash control.

and rake mechanisms from the channel for inspection, adjustment or repairs is an improvement of note.

Authorities familiar with the Los Angeles sewage treatment plant agree that fine-screening alone does not furnish a satisfactory effluent for their conditions. An experimental treatment plant has been used to study types of treatment which might be satisfactory for Los Angeles. The data secured will be used as a basis for the design of a new plant.

While many sewage treatment plants are equipped with screens, only less than a half dozen plants remain which depend on screening alone or screening plus chlorination. The "screening by itself" process now represents only one step forward in a historical evolution in sanitary standards.

Settling

The combination of flocculators and clarifiers, while not new this year, shows increasing application in sewage treatment uses. So-called non-settleable and colloidal solids can be made to settle out in a reasonable time by previously subjecting the sewage to a relatively short period of mechanical flocculation. And, again, chemicals may be utilized seasonally to further increase removals of putrescibles by this combination of units.

Indications are that flocculators will be used to improve settling efficiency both for raw sewage and for trickling filter effluent ahead of settling. Research work on clarification has been along the line of improving feed distribution and effluent take-off. Velocities greater than 1.5 feet per second may break up flocculation in passing from flocculator to clarifier. Changes to high grade reduction gears and the use of replaceable wearing parts and center pier bearings are reported by Johnson of Chicago to be marked improvements in the mechanisms of clarifiers.

Following experiments with flocculation-sedimentation at the Los Angeles City Pilot Plant, the design for the new sewage treatment plant was changed. The results of the experimental plant indicated that the theoretical data originally used were more liberal than necessary for the proposed new plant. It is estimated that several hundred thousand dollars will be saved as a result of these experiments.

An interesting comparison of a flocculator-clarifier operation with that of a clarifier alone indicated that the flocculator-clarifier is capable of handling successfully a larger *rate* of flow than the clarifier alone, producing lower suspended solids and B.O.D.'s. Similar results with this system have been obtained in Ypsilanti, Mich., and

Bakersfield, Calif.

In a small treatment plant serving Atlantic, Iowa, with a population of 10,000 people and an additional population equivalent of 10,000 people from the industrial wastes, flocculation, primary settling and trickling filters are used for nine months of the year and for three months chemicals for precipitation, with double filtration at times, are used.

Chemical Precipitation

Rudolfs emphasizes the advantage of chemical treatment by reducing loads on secondary units. Alum is cheap and easy to apply and the floc is voluminous. Many chemical plants obtain 50 parts per million suspended solids in the effluent at reasonable costs.

Hurwitz reports that sodium silicate and copperas at Chicago's West Side Works gave better B.O.D. removals than other coagulants or combination of coagulants.

The use of chemicals for flocculation is again being employed for treating sewage requiring treatment a little better than plain sedimentation, but not equal to the treatment obtained by oxidation processes.

Dr. Anthony Fischer again emphasizes that chemical treatment deserves consideration when seasonal or part-time treatment is required, as an adjunct to biological treatment, where industrial wastes are discharged into the system, or for odor control. It can produce a sparkling clear effluent low in suspended solids, but cannot compete with biological processes in producing low B.O.D.'s. Provisions for chemical treatment for new and small plant design seem desirable where seasonal overloading is indicated as likely.

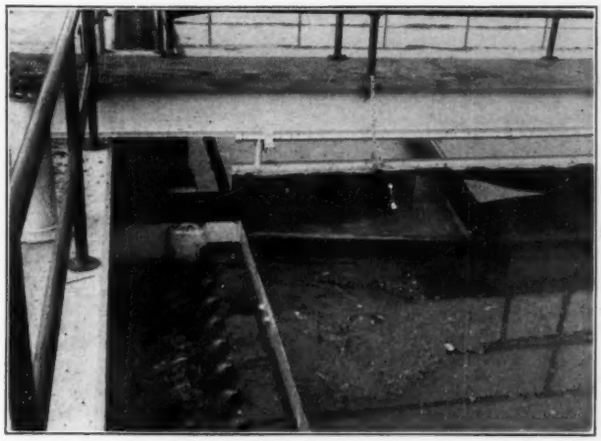
Grease and Scum Removal

The problem of grease and scum removal is receiving more attention in recent years, partly due to the increased interest in discharging garbage into sewer systems.

Babbitt stated that several years ago the entire garbage load of a community would more than double the grease load of the treatment plant.

Grease is one of the offending constituents most commonly found in garbage waste. In addition to clogging fine screens and producing unsightly masses on the side walls of settling tanks, oil has been known to interfere with Imhoff tank operation and the activated sludge process. Grease also clogs filters, nozzles and sand beds. McClellhan states that the most destructive agent to paints is a tar like accumulation of oil and grease from the sewage.

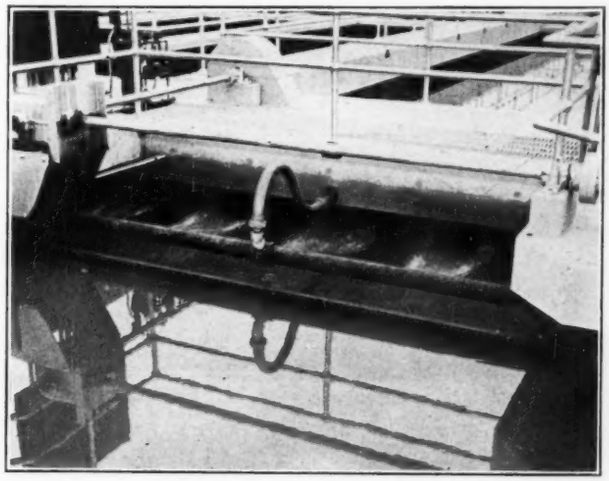
Rawn of Los Angeles referred to the advantage of aero-chlorination in respect to the removal of greases and reduction of spontaneous oxygen demand in sewages. He stated in a recent paper read to the Sewage Works Federation Convention in October that grease removal, pre-flocculation and partial chlorination comprised the simplest methods to be used in handling seasonal loads of industrial wastes.



Dorr's Improved Tank Skimmer—1940

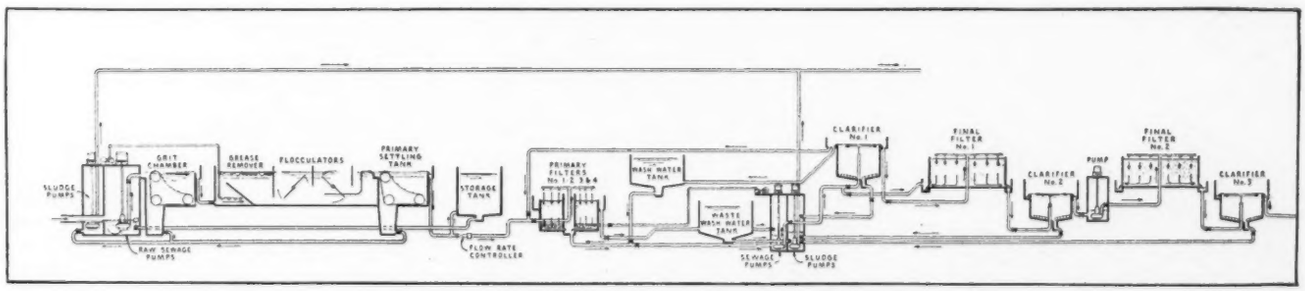
Designed for positive trapping of scum and minimum liquor take-off. This installation is on Gary's primary clarifiers.

The new sewage treatment plant at Dallas, which went into service during the year, included grease re-



Scum-Sweeps at Dallas, Texas

Fish-tail jets drive scum brought up by Chain-Belt Skimmer into tank end pockets. From these pockets accumulations are dumped at pre-set intervals by program clock operated dipping weirs.



Diagrammatic Section—Packinghouse Waste Treatment Plant of Armour & Co., Fargo, N. D.

Secondary treatment involves high-rate decolloidizing washable filters, followed by low-rate filters designed to operate in parallel normally, or in series when the highest degree of purification is demanded of the plant. A very similar plant has just been completed for South St. Paul, Minn. to serve the dual function of treating municipal and packhouse sewages. Another is under construction at Newport, Minn. for the Cudahy Packing Co. The very successful Fargo plant is described by L. R. Howson, designing engineer, in the May 1940 issue of this magazine.

Two of the High-Rate Primary Filters at Fargo

The rear unit is receiving the film loosening air wash, given upon indications of pounding. The perforated air pipes rest on the Armcre vitrified block drain bottom of the filter. The air is followed with an up-flow wash with plant effluent. These primary decolloidizing units take loadings of 5000 to 6000 lbs. of 5 day B.O.D. per acre/ft. per day. The three arm distributors are of Pacific Flush Tank Co. design.

moval. The design has been rather specialized to cope with local conditions. The sewage is received at the plant in completely confined air-tight enclosures that house the bar screens and grit chamber. It is blown with plain air, then with chlorinated air, and may have iron salts added to fix any residual free hydrogen sulphide. A dry feed chlorinator is used in aero-chlorination for grease removal. The detention time is eight minutes, using air alone for four minutes and aero-chlorination for the second four minutes. A ridge and furrow arrangement is used for grease separation rather than spiral flow. Grease and scum is swept from the surface by flat water sprays, or to an area for automatic removal.

Automatically skimming scum from the surface of Imhoff tanks at Cleveland's Westerly Plant and the sedimentation tanks at the Richmond-Sunset plant in San Francisco are recent installations.

At Woonsocket, R. I., the additional grease yield varied from 189 to 442 per cent by using aero-chlorination instead of air alone. The application of 1.5 parts per million of chlorine was used.

Trickling Filters

In the 1939 sewage treatment progress review, which appeared in the February, 1940, issue of this magazine, trickling filters and trickling high rate filters were discussed. During 1940 seventeen new trickling filter plants have been completed under the P. W. A. program. A series of articles on the design and operation of trickling filters was published during the year in sewage works journals because of the interest in this new development.

As expressed by Fischer, the trend of interest has been from activated sludge to chemical treatment, and now to high-rate filtration.

Max Levine states in a recent article that in the experiments carried on at the Iowa Engineering Experimental Station during 1925-35 it was found that the marked fluctuating concentrations of creamery wastes from small Iowa dairies seriously disturbed the purifying functions of the activated sludge floc but did not affect the trickling filter. He summarizes the present status of trickling filters in the following manner:

With coarse-grained filters, short dosing cycles are conducive to a more uniform rate of discharge and materially increased efficiency. The more uniform the rate of discharge from a filter, the more nearly *is* the maximum efficiency of the unit for the load which it is receiving being approached.

Highly concentrated wastes, with B.O.D.s up to 3,000 p.p.m. have been effectively treated by series filtration. A settling tank is interposed between the filters for the purpose of removing agglomerated colloidal and finely suspended matters effected by high-rate primary filters of the fine grain washable type or the coarse grained deeper filters.

Fine-grained trickling filters of the washable type and coarse-grained high-rate filters may be effectively employed for the removal of large quantites of B.O.D. constituents or for reduction of excessive fluctuations in concentrations of wastes reaching a final process of purification.

Removals of 4,000 to 6,000 lb. of B.O.D. per acre foot are feasible with shallow, fine grained, washable units or with deep, coarse-grained, high-rate trickling filters combined with pre and post clarification.

Liberty, N. Y., adopted high-rate filtration with settling and recirculation (Biofiltration), since a high degree of treatment during the summer with a high concentration of laundry wastes

The Treatment Works of Corpus Christi, Texas

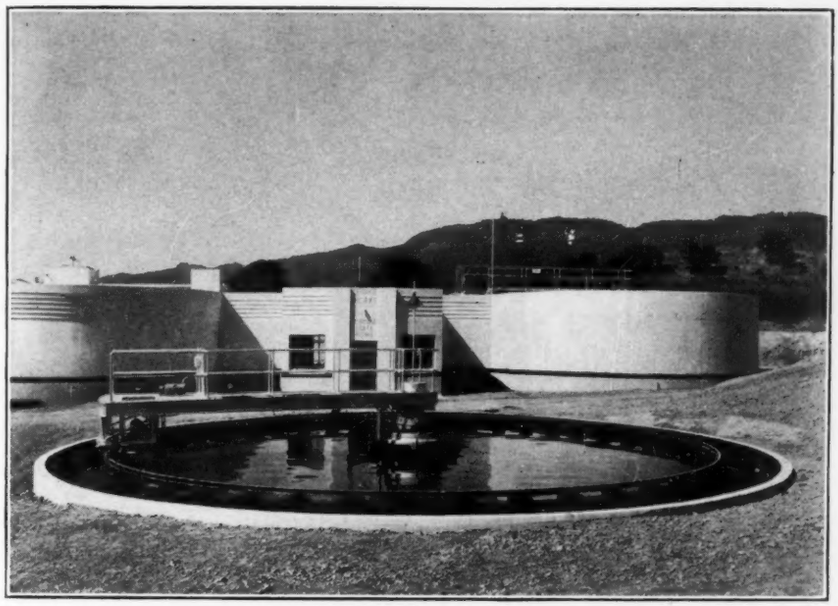
Sells $100.00 worth of a consistently high grade effluent each day to an oil refining company for industrial use.

was necessary. In dry weather the stream flow is about equal to the plant discharge. Operating results in September of 1940 indicate reductions of B.O.D. from an average of 275 p.p.m. in raw sewage to an average of 8.7 p.p.m. in final effluent, and reductions in suspended solids from 175 to 4.4. The average dissolved oxygen was 8.2.

A small 200,000 g.p.d. plant using Imhoff tank, trickling filter and final settling tank was installed at a T. B. sanatorium in Alto, Ga.

Treating waste from citrus juice canning plants was found by the Texas State Health Department to be difficult. In experiments on a laboratory scale, activated sludge treatment and trickling filters yielded the most promising results. Their results were not sufficient in themselves, but the problem has been solved by aggregating the wastes from the different stages in operation and treating in addition at these individual points.

A trickling filter was installed at Seaside, Ore., with primary and secondary settling. A number of difficult problems were met and solved in this plant.



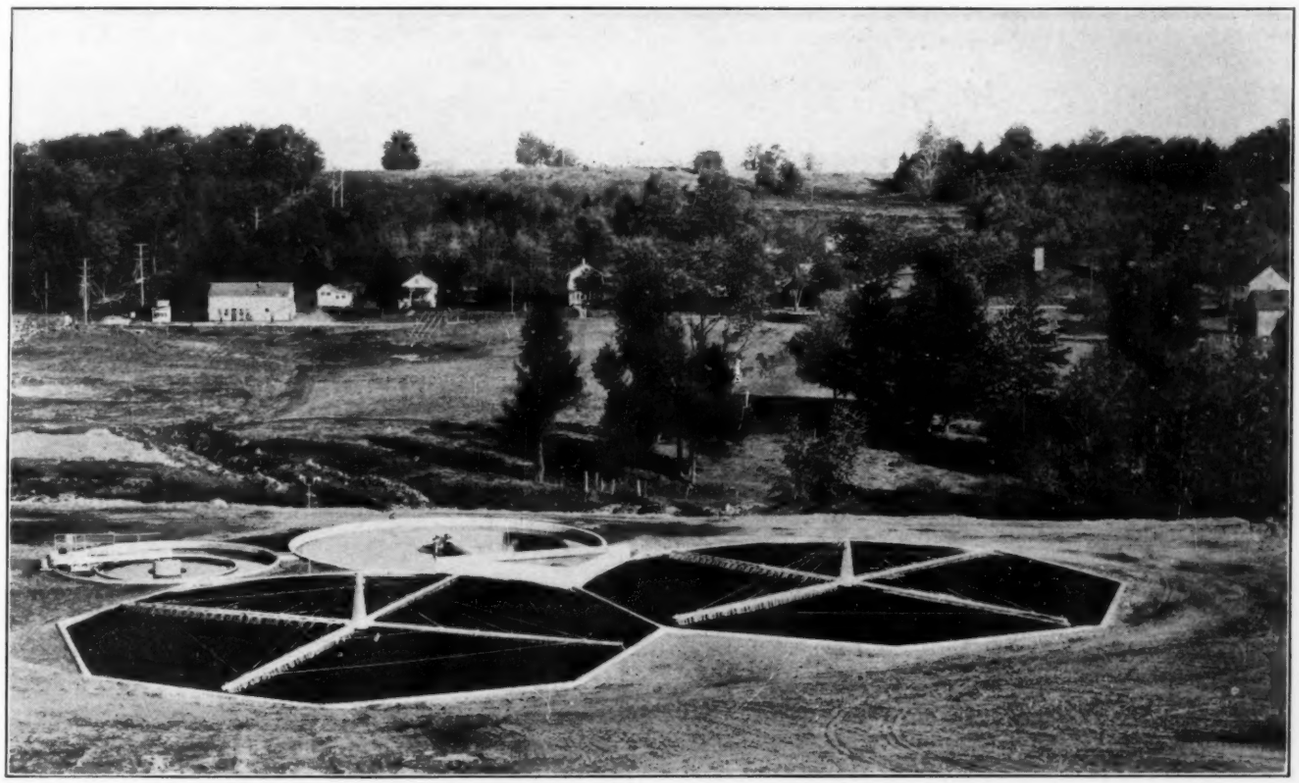
A Neat, Efficient and Economical Little Plant

The 1.5 M.G.D. Bio-filtration plant at the Sonoma State House, Eldridge, Calif. polishes the effluent from high-rate recirculated filters by straining it through the magnetite filter within the final clarifier located in this plant's "front yard." This little plant is something of a model for compactness and trimness, also the effective use of economical architectural concrete.

At Atlantic, Iowa, a city of 10,000 people (with corn, squash and cannery wastes equivalent to an additional 10,000 people for three months), has built a treatment plant with provisions for flocculation and single or double filtration. During the three heavy months, chemical precipitation will be used in addition with single or double filtration, as circumstances justify.

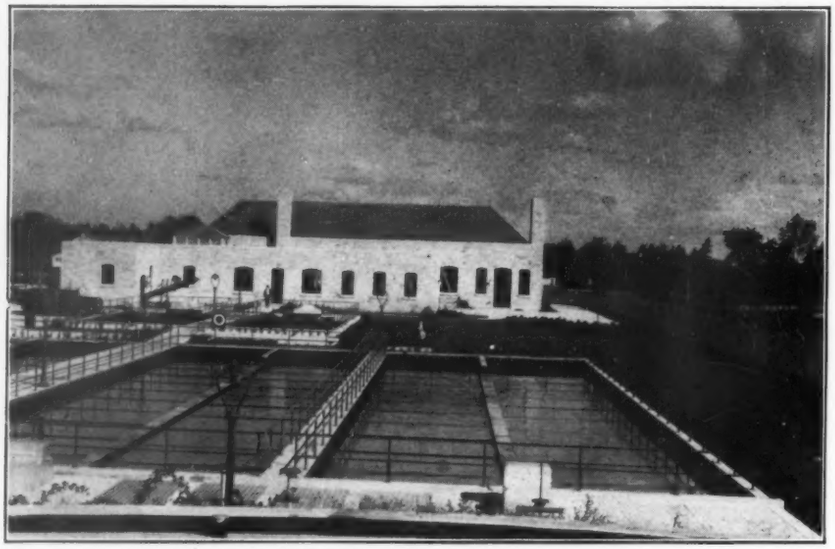
Other trickling filter installations were made at the village of Excelsior, and Owatonna, Minn. The Owatonna installation has secured 85-92 per cent B.O.D. reduction.

Dallas selected trickling filters because of the variable and strong sewage there. The first cost for trickling



The Biofiltration Plant of Liberty, N. Y.

Is believed to represent the first combination of high-rate filters and effluent strainer to be installed in the East. The 3 ft. deep bio-filters take loadings ten fold those of low-rate filters. This plant has a record of better than 96% reductions of suspended solids and B.O.D.—See text.



The Treatment Plant of Kenosha, Wisc.

This rear view across the flocculators in the "back yard" of Kenosha's new chemical precipitation plant is indicative of what is happening in the way of architectural treatment of sewage plants which are now commonly constructed in conspicuous locations. Kenosha's plant is actually located in a lake-shore park. Needless to say it must behave in keeping with its looks and effective odor control and good housekeeping are two "musts" in this "Chateau de Sanitation."

filters was high but the operating cost was low. Design of the new plant just finished was based on experiments begun eight years ago and involving activated sludge and chemical precipitation. The Dallas filters may be operated in series or in parallel.

Hibbing, Minn., a city of 16,000 people, has just finished a complete sewage treatment plant including trickling filters with primary and secondary clarifiers and with post chlorination. An unusual feature are the concrete domes which cover the trick ling filters.

Lake George, New York, has installed trickling filters with primary and secondary settling tanks and with final effluent completely disposed of into the ground.

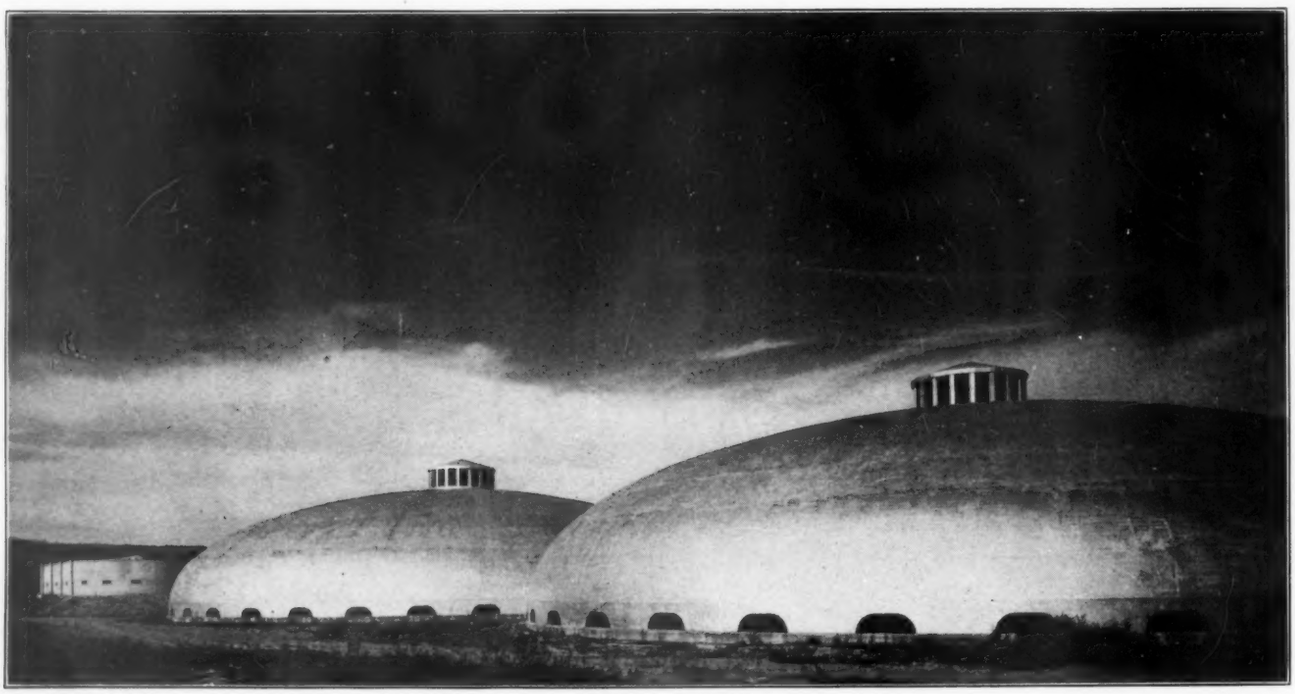
Lakeport, Calif., has installed a two-stage biofiltration unit with storage of effluent for 10-20 days in effluent ponds.

A standard biological filter was successfully converted into a high rate recirculating filter for milk wastes at Perrington, Mich. Results show a 77.1 per cent reduction in suspended solids and 90.6 per cent reduction in B.O.D.

Trickling filters have been found valuable where activated sludge would not work. Results with packing house wastes and dairy wastes have shown that filters may be dosed at higher rates. They may serve as primary units for the removal of heavy oxygen consuming matter ahead of secondary treatment.

High rate filters need good ventilation. Ability to collect colloidal matter has not been appreciated in the past. Shock loads are handled on high capacity filters. They should be protected from cold weather. A four-foot depth seems sufficient.

Shallow filter beds are more efficient than deep ones per unit of volume where both high and low rates of filtration are used. Shallow, well-drained beds do not need artificial ventilation. Biofilters should be rated on B.O.D. removal rather than dosing rate. With uniform distribution, provided maximum B.O.D. loading is not



The Interesting Plant of Hibbing, Minn.

The two trickling filters, 150 ft. diam. each, are covered by concrete domes known as Z-D domes. These domes are self supporting, there being no columns inside the structures to interfere with the rotating distributors. On the far left is one of the clarifier housings; another houses the twin final clarifiers. The enclosures are protection against the severe protracted cold weather of Hibbing.

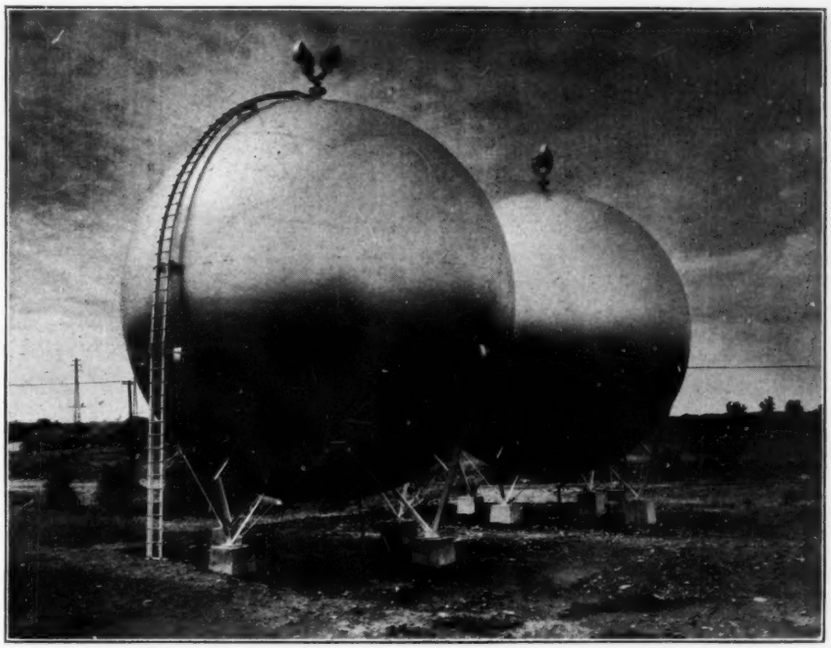
exceeded, satisfactory operation may be secured up to the point of flooding the bed (may be up to 100-120 million gallons per day per acre).

Keefer, in his Baltimore series of experiments on high rate trickling filters, found that it was practicable to operate his trickling filters at a rate of from 6.5 to 30 million gallons per acre per day without ponding.

As the rate of operation increases, the B.O.D. of the effluent increases. The B.O.D. increase is not marked at a 10 million gallon rate, and at a 26 million gallon rate the reduction in B.O.D. in the winter was 50 per cent and in the summer 70 per cent or more.

High rate filtration gave results between primary sedimentation and low-rate trickling filter treatment. With sedimentation and high-rate trickling filters, the results compare favorably with chemical precipitation or sedimentation followed by mechanical straining filters. The degree of treatment depends on the rate and the depth of the filters.

This universal revival of interest in orthodox and "high-rate" trickling filters is one of the heartening features of modern practice. This type of filter and process has always been one of the "hardy" methods of sewage treatment.



The Twin Pressure Gas Spheres of Rock Island, Ill.

Because of anticipated extra gas yield from the dual sewage-garbage treatment plant of Rock Island and the need for ample gas storage to offset fluctuations in yields from garbage receipts, practically double the normal storage was installed to assure flexibility. With diameters of 36 ft., each Hortonsphere provides 50,000 cu. ft. storage at the operating pressure of 50 lbs./sq. in. The plant has 7 gas engines for operating pumps and another for producing electric current.

Activated Sludge

Gail P. Edwards believes that the most important factor to control in this process is the *rate* of air application, because of its cost. Controlling the D.O. in the aeration tanks, the sludge index, the microscopic examinations and daily chemical examinations are important aids in efficient operation. The D.O., the sludge index, and concentration of solids in the aeration tank vary with different sewages.

At the Ward's Island Point, New York City, the dissolved oxygen content leaving the aeration tanks is about five parts per million and is considered satisfactory. Daily microscopic examinations are made at Ward's Island in order to anticipate developments of filamentous organisms. These organisms are associated with bulking. At times of heavy rains, bulking is not a problem. Chlorine treatment of recirculated sludge is used to control bulking of the type associated with such filamentous growths. Chlorine in a controlled plant scale experiment reduced bulking 35 per cent. An attempt to reduce the organic content of sludge by adding clay was not entirely satisfactory.

Some of the variables under direct control are: the rate of application of air, the concentration of suspended solids and the proportion of sludge return. It is generally recognized that more oxygen is consumed at the beginning of the tank than toward the end. Several methods have been demonstrated for supplying air according to needs.

One of the newer ways used in the plant at Hackensack, N. J., and in the plant under consideration at Muncie, Ind., consists of diffused air aeration in the first

The Chlorine Control Room—Dallas, Texas

The unit feeding chlorine gas to the air line for providing grease separation by aero-chlorination is the dry feed machine in the center. At the plant chlorine may be used for a variety of purposes.

part of the aeration period followed by a combination paddle wheel and diffused air system.

In New York City, "Step Aeration," or adding sewage at multiple points throughout the course of flow of the returned sludge as it progresses through the aeration tanks instead of tapering the air input, seems to have been successful enough to warrant incorporation of the method in the design for three other plants.

The new North Buffalo 6½ million gallon activated sludge plant at Greensboro, N. C., reports on two years' operation. The plant operated satisfactorily for six months with domestic sewage only and then met many difficulties as textile wastes were added. The change required an increase in air, a 50 per cent digester capacity increase and pH control was necessary with greater variations in required chemicals. The need for trained operators for adequately meeting these problems of plant operation was emphatically illustrated.

The role of Sphaerotilus Natans in activated sludge bulking is being studied as mentioned in this review under the heading "Research."

Chlorination of Sewage

A recent development for automatically adjusting the chlorine dose to both variation in flow as well as to chlorine demand is reported. Manual control has been somewhat inefficient. The use of a measuring and reference electrode, as used in a cell through which some of the sewage is passed, controls the rate of chlorine dosage. This is called Potential Control Chlorination.

The first plant to adopt Potential Control Chlorination is thought to be Syracuse, N. Y. The recently constructed sewage treatment plant at New Haven, Conn., and the Richmond-Sunset plant at San Francisco both provide for chlorination of the effluent during the bathing season.

Aero-chlorination, for improved grease separation from sewage and trade wastes, is the most recent development in the extended use of chlorine in sewage treatment. The demonstration of its usefulness at Woonsocket, R. I., Baltimore, Md., and Lancaster, Pa., has been further confirmed through studies of the method at Armour Institute of Technology under Dr. Mohlman. The method was adopted at Cleveland, Ohio, and during the year, as earlier pointed out, the new Dallas, Texas, plant has recently put a combination of 4 minutes air-blowing and 4 minutes of aero-chlorination into operation. The results have not to date been published. It was revealed in a recent paper by A. L. Fales, of Boston, and S. A. Greeley, of Chicago, that the design of the sewage treatment plants for Boston will incorporate provisions for aero-chlorination. The process will be used only to the extent that the cost of operation can be justified to better grease separation. The treatment will involve clarification, with emphasis on removal of materials which may float on the waters of the harbor.

At Detroit, Mich., the largest chlorination plant yet constructed is in operation.

Sludge Concentration, Dewatering and Incineration

Elutriation

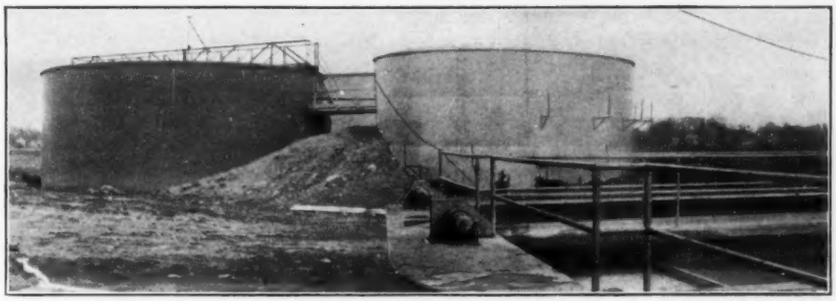
Annapolis began experimenting with elutriating

Gary's Engine and Blower Room

In the foreground are three motor driven Elliott Centrifugal Blowers of 5000, 7000, *and* 9000 *c.f.m. capacities. In the rear are the two Cooper Bessemer Gas Engines direct connected to Roots Connersville Blowers of* 7000 *c.f.m. capacity each. The value of gas produced from garbage solids alone has been calculated to be* $13,000 *annually for power.*

sludge before dewatering in 1939. The first trials were so successful in savings that it was adopted. Since then well water, brackish bay water, and clarifier effluent have all been tried and the latter has proved most effective and least costly. With much less ferric chloride than formerly, and with no lime, the yield of the filter used for dewatering is 10 lb. per sq. ft. per hour. The cost has been cut in half. The significance of the work at Annapolis is as much in the amazing ingenuity of the operator as in the technical findings.

In a recent report on the first year's operation of the Richmond-Sunset, San Francisco, plant it is stated that sludge is elutriated with sewage effluent. The sludge is then dewatered on vacuum filters and used on the park golf courses and other park areas.



The Waste Treatment Plant of Oscar Mayer & Co., at Madison, Wisc.

This chemical precipitation plant, treating packinghouse wastes, has been enlarged during the year. In right foreground are the original Chain Belt settling units. In the right background is the recently installed sludge thickening clarifier, equipped with a "Rex" Tow-Bro. thickening and sludge removal mechanism. This thickener mechanism is operated to yield sludge of the maximum density that will flow through the discharge pipes delivering to the vacuum filters.

Conditioning

At Aurora, Ill., alum was used to separate water from sludge. A short mixing period was most satisfactory. A marked difference was noted in the appearance of a bed of alum-sludge and one of plain sludge. The alum sludge was rough, lumpy and had a bubbly surface, while the plain sludge was slick and watery. The alum sludge dries quickly after a rain. There was an 8 per cent reduction in cost of sludge bed cleaning.

It was reported that alum had been used also in Geneva and Batavia, Ill., and that these two activated sludge plants obtained similar results.

At Elmira, Auburn and Greece, N. Y., ferric chloride and lime are used before drying on vacuum filters and incinerating. At each of these three plants ferric chloride in the anhydrous form was abandoned in favor of the liquid form, due to the problems of handling the dry form and the fact that there was very little difference in cost.

J. R. Downes, of Plainfield, N. J., reports that freezing and thawing sludge destroys sliminess and allows water to drain off rapidly. When dewatered, the solids are in a clay-like condition with a water content of 65 per cent.

Vacuum Filtering

There are some 88 plants equipped with vacuum filters. Canton flannel cloth gives about 250 hours of service, producing about 100 tons a day per filter at Buffalo, N. Y., and is considered best for their conditions.

At Auburn, N. Y., cotton cloth was found to be better than glass cloth. The cotton cloth gave 661 hours of service, handling on two filters about 1,500-2,000 lbs. per hour.

At Greece, N. Y., in the new million gallon a day activated sludge plant, the sludge is stored, filtered and incinerated. Before vacuum filtration the sludge is conditioned with ferric chloride. It is drawn to the filter by vacuum as taken from the suction line to the filters. This system has been satisfactory, and eliminates pumping without robbing the filter suction.

Dual Treatment or Incineration?

Garbage can be added to sewage for treatment by grinding and discharging from home into the sewer or by collecting from the homes as garbage and delivered to grinding stations for discharge in convenient trunk sewers. Or collecting and delivering direct to the disposal plant for addition to sewage or sludge at some point in the treatment.

Gary, Ind., has a new activated sludge plant which will include provisions for grinding garbage to sewers and digestion. It was estimated that incineration of garbage would cost $32,940 annually but only $13,565 if disposed of into sewers. In addition, it is estimated that it will increase the value of the gas yield at least $13,000 a year.

Lansing, Mich., since February, 1939, has been digesting its garbage with sewage sludge. Without garbage the gas production averaged 100,000 cu. ft. daily, but with garbage it averaged 213,000 cu. ft. per day. Trouble is experienced with pieces of bones, egg shells, and fruit pits, which settle without digesting and cause clogging of sludge pipes. This trouble will be corrected, it is expected, in the near future.

The Rock Island, Ill., plant includes digestion and incineration of both sewage and garbage. The multiple-hearth incinerator has a capacity of 24 tons daily. The garbage can be ground and added to the incinerator or at the sedimentation tank for settling and digestion.

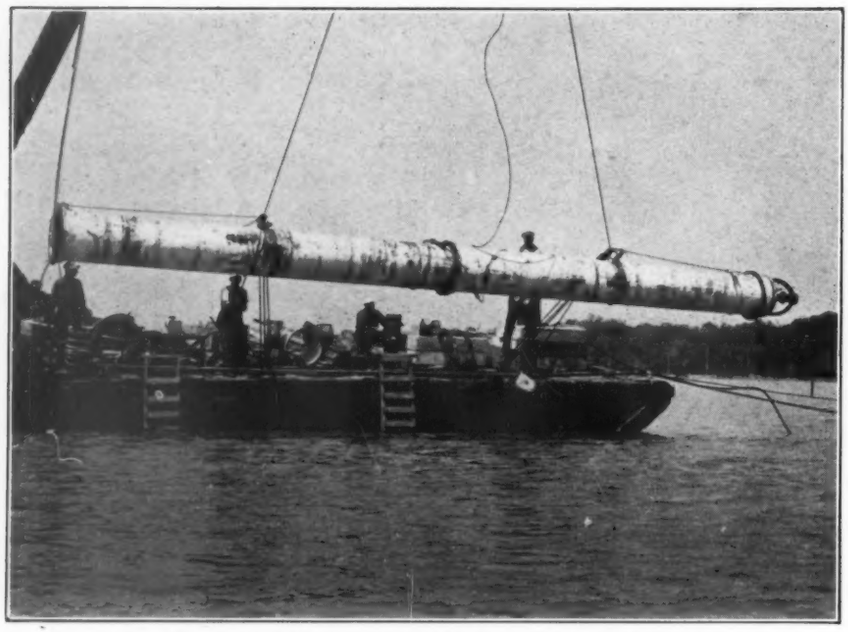
At Greece's (N. Y.) new activated sludge plant they have been incinerating filtered sludge cake since September, 1939. The cake has averaged 74 per cent moisture and 41.8 per cent combustible material. An average of 36 gallons of fuel oil per ton of dry solids was used for operating the incinerator. It is expected that when the flow of the plant increases, the sludge is fresher, and it is not necessary to add so much lime, the combustible content of the filter cake will be higher and the use of auxiliary fuel will be unnecessary.

Sludge Gas Utilization

The utilization of sludge gas is not only one of the most interesting developments in modern sewage treatment practice, but it appeals to the public, eliminates a potential nuisance, and helps to lower operating costs. Its use has become an established part of sewage treatment practice, for plant lighting, heating, fuel for internal combustion engines and for incineration of screenings, skimmings and sludge.

At Fort Dodge, Iowa, the revenue derived from gas-generated power last year equaled 42 per cent of the cost of operation and maintenance. Surplus power was sold to the local utility company for 0.85 of a cent per kilowatt hour.

At Davenport, Iowa, temporary excess gas was stored in a 58,000 cu. ft. spherical gas holder up to 50 lb. pressure. Forty-six thousand cubic feet of gas are produced daily at Durham, N. C. Lime is used to control gas production and quality and the power produced is interchanged with the city's electric plant and the local power company.



Improved Method of Laying C.I. Pipe Outfalls
Employed on the project of Ossining, N. Y. on the Hudson.

Furman states that during 1939-40, 2,275 horsepower for pumps has been developed, 2,463 horsepower for blowers and 1,541 horsepower for generators with sewage gas.

Sewage Sludge for Fertilizer and Soil Conditioner

A recent report by the U. S. Department of Agriculture states that 113 localities in 15 states use sewage effluent for irrigation. This has proven beneficial and satisfactory where some treatment is given before discharge. Permits to use sewage effluent for irrigation are required in the states of Arizona, California, Colorado, Maryland and Washington. There are laws covering this in the states of Kansas and New Mexico. The State Health Departments in the other states have regulations or policies covering the use of sewage effluent for irrigation.

Dr. Rudolfs has recently published an excellent statement regarding the fertilizer values of sewage sludge. He emphasizes hidden values in sludge, in addition to the usual constituents of sludge which are supposed to indicate its value as a fertilizer. Among these hidden values are certain minor chemical elements and substances which promote plant growth. Sludge prevents depletion of humus, improves soil structure, increases water holding capacity of sandy soil, and is capable of increasing the fertility of the soil. However, there is no known measuring stick for these hidden values except observations on growth. He urges that the problem of disposal of sludge be thought of as a question of how to conserve values rather than as a question of destruction of noxious matters.

His report is particularly timely since nutrition experts are becoming increasingly concerned with the excessive depletion of important elements in soils in agricultural use. The losses in phosphorus particularly are prodigious. Sewage is one of the possible replenishers. We ought to concern ourselves with it more seriously.

At Battle Creek, Mich. (noted for "breakfast food"), a rather wet and somewhat difficult to handle sludge is sold for fertilizer. According to the annual report, they estimate the value of Battle Creek plant food at $19.75 a ton. They have prepared a table showing the quantity in a ton of B.C. plant food of the following elements:

Nitrogen.
Phosphorus.
Potash.
Lime.
Ferric chloride.
Humus.

Financing Sewerage Systems

The major problem in the initiation of any new sewerage system is the method of financing. Unless the municipality can see its way clear to spend the amount of money necessary for the project, it won't be built.

In recent years considerable thought has been given to sound methods of financing sewerage construction, maintenance and operation. This may be particularly acute for the smaller cities even when the P. W. A. can assist materially with the financing.

Woodbury, N. Y., has just completed a treatment plant, for which amortization and operating costs will be paid by sewer rentals. They will be collected with the water bill and the rentals and fees are a lien upon the property.

Fairmont, Neb., a city of 750 people, built a new sewerage system as a W. P. A. project. The city bought the pipe and paid for the engineer, while the W. P. A. furnished all labor and all other materials besides the pipe.

A city in Florida proposed to issue Utility Revenue Certificates to secure a loan from the Federal Emergency Administration of Public Works and to improve and extend its sewer system. The city would pledge a portion of the income from the electric and water plant and such indebtedness does not require a vote by the taxpayers.

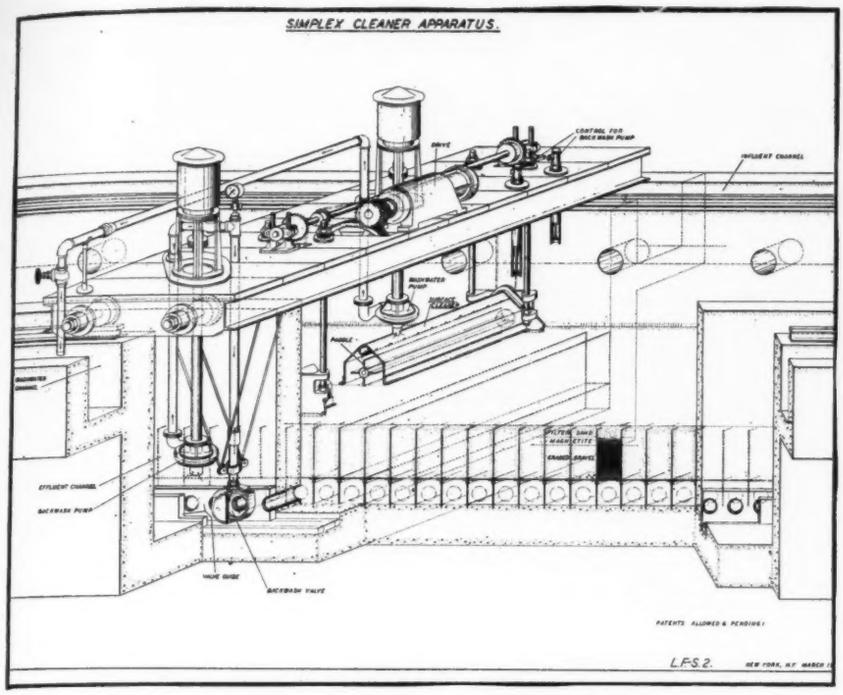
Louisville, Ky., is taking the industrial waste from several distilleries just outside the city for treatment. The city can regulate the discharge of acids. The charge to the plant is 43 cents per $100 assessed valuation per year.

South St. Paul, Minn., is building a million dollar plant for domestic and industrial sewage treatment. The packing house industry of the city will by agreement pay 65 per cent of the first cost and 90 per cent of the operation and maintenance. The waste from these plants is equivalent to the sewage from a population of 200,000 people while the population of the city is only 10,000. This plant is one more to mark what seems to be a definite trend in the direction of municipalities taking over treatment of wastes of local industries and charging an equitable rate for the service yearly. There are new instances of municipalities which revamp existing plants or construct specially designed plants for the purpose of caring for wastes of tax-paying industries within their gates.

Portland, Ore., is to expand, improve and extend its sewerage system on a pay-as-you-go basis by charging sewer rentals. The completed project will cost $9,000,000. It is proposed to expand the system from year to year as money from rentals becomes available.

Fort Dodge, Iowa, charges a sewer rental of five cents per 1,000 gallons of water used. Collections cover more than the cost of operation. In addition, approximately $10,000 worth of power from sewage gas is sold and used for improvements.

Chicago is studying the waste from 210 establish-



Laughlin's Improved Sand Filter and "Simplex" Bed Cleaner

A 1940 development which has found use in treating industrial wastes and sewage. The basic features are continuous top-sand wash and progressive sectional up-flow wash at required frequency.

ments using the public sewers. These industries are now paying for all waste discharged to the sewers exceeding 3,500,000 gallons in any 12 months' period. Quality as well as quantity needs to be considered in estimating a fair cost to the city, according to Knowlton, in discussing this problem.

Corpus Christi, Texas, is selling a definite grade of effluent to an oil refinery for $100 per day. After effecting a 97 per cent reduction in B.O.D. with settleable solids at almost 0 and dissolved oxygen of 6.7 p.p.m., it was considered satisfactory and payments started. The final difficulty in producing a satisfactory effluent was solved by using chlorine to control slime growths. The treatment plant includes a simple trickling filter with primary and secondary sedimentation. Allison, the chief operator, deserves a special palm for showing how to meet an unusual industrial demand by pushing sewage treatment performance up to a very high level.

Research

Several laboratories have been active in sewage treatment research during the year 1940. Studies have been continued with reference to the underlying factors influencing behavior of the biological life in sludge. An effort is being made to understand better the influence of environmental conditions upon the growth and efficiency of the animal and plant organisms and upon their enzymes. Feeding the microscopic life utilized in activated sludge treatment is one of the important factors in more efficient operation and research is underway to learn more about an adequate balanced diet for optimum efficiency.

The problem of feeding these organisms is complicated by the fact that while some of the simple foods are directly available to them, enzymes must be used to break down the more complex substances to simple foods.

The part that zooglea ramigera and sphaerotilus play separately, or on one another, in the digestion of the sludge is being studied. The effect of sludge concentration of B.O.D. removal, the effect of temperature on the growth of organisms responsible for stabilization of the carbonaceous matter and the carbon and nitrogen transformations by zoogleal bacteria have been reported on. The role of nitrifying bacteria, protozoa and higher filamentous organisms have been found to be of secondary importance to the purification process brought about by the zoogleal bacteria.

A number of experiments have been carried on at the West Side Works at Chicago with some of the newer developments in sewage treatment, namely, the Halvorson high-rate trickling filter, Jenks two-stage biofilter, chemical precipitation, magnetite filters, short aeration period activated sludge and the Guggenheim process. As summarized by Mohlman, discussing these Chicago studies, "the most striking fact is the superiority of the short-period activated sludge effluent over all others. The chemically treated effluent was considerably inferior, even if supplemented by final mechanical filtration. High-rate biological filters gave better effluents than chemical precipitation and about equal to chemical precipitation plus filters, but decidedly inferior to activated sludge."

Trends in Legislation in District and Stream Sanitation Programs

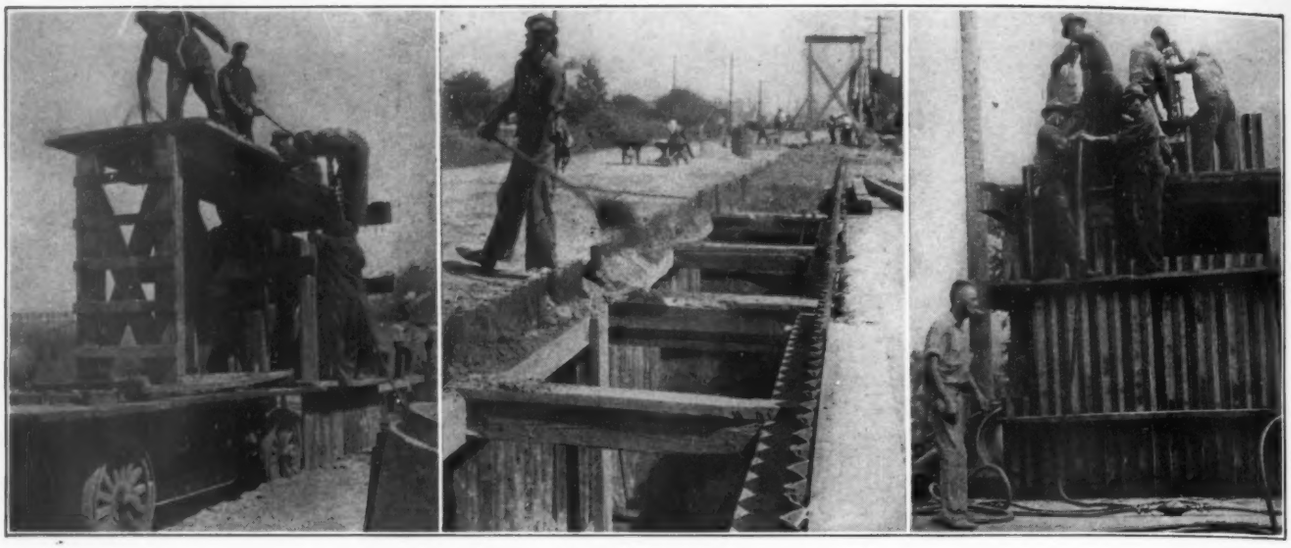
Although Federal legislation establishing a National policy on stream pollution (The Barkley Bill) is still in the air, considerable progress in district compacts has been made. The first two interstate anti-pollution covenants were authorized by Congress this year.

The Ohio River compact includes Illinois, Indiana, Kentucky, New York, Ohio, Pennsylvania, Tennessee and West Virginia as signatory states. They pledge faithful cooperation in the control of future pollution and in the abatement of existing pollution. They agree to enact new legislation. The Ohio River Valley wants sanitation districts created and a commission consisting of three commissioners from each state and three commissioners from the United States Government, has been set up to direct the affairs of this district.

The Potomac Valley District is quite similar to the Ohio Valley. The states of Maryland, West Virginia, Pennsylvania, Virginia and the District of Columbia are included in this district.

According to four papers on Pollution Abatement in the New York metropolitan area considerable progress has been made since the formation of the Inter-state Sanitation Commission. The area was classified according to expected predominant use and standards were adopted for each class, specifying the degree of treatment necessary for all sewage or other polluting matter entering the waters of the District. The Commission was authorized by the states of New York and New Jersey to begin legal action against any municipality or other entity violating the classifications or laws. At the present rate of construction the program will overtake current requirements within ten years.

A limited number of follow up reviews have been written of streams on which corrective measures have been established. Examples of such checks on reduction



Sewer Construction With Corrugated Sheeting
Is a rapid inexpensive sheeting method developed in Louisville, Ky.

in pollution are the studies on the Raritan, the Niagara, the Scioto, the Illinois and the Potomac rivers.

In the Raritan River basin with the assistance of the P.W.A., the use of court action in several instances and a definite planned program, all of the twenty municipalities on the river installed or improved sewage treatment works to meet standards adopted by the State Health Department. The second step in this program included a survey of the industries on the river, the quantity and quality of their wastes and the effect of these wastes on the river. The effect of the new sewage treatment plants is now being studied. To date the results obtained are as follows:

Sewage = 21.5 million gallons per day

	1937	1940	% reduction
B.O.D., pounds	27,669	12,941	53.2
Suspended Solids, pounds	23,273	6,707	71.1
B. Coli per c.c. per plant.	205,000	100	99.9

(partial completed)

Considerable progress has already been made on cleaning up the industrial waste situation in the Raritan basin. After only two years of study and cooperation, 19 of the 37 industries have either installed treatment plants or removed their discharges from the river, four others were not considered polluting at time of inspection, seven have treatment plants under construction, four are still studying methods of treatment, two are under legal notice and one is constructing a new plant off the water shed.

Defense Problems

One of the major problems raised by the Defense Program is that of financing the unusual necessary expansions in small average facilities taxed by a large influx of workers to emergency defense industries. In some cases the new population is greater than the existing population.

Several articles have appeared during the year raising other possibilities as defense problems. One of these is possible sabotage. The suggestion is that each plant study and inventory both personnel and plant. The inventory of personnel should be from the standpoint of replacements or promotions which may be necessary, qualifications for new personnel and a back-

The Basins of the Santa Fe Springs Waste Water Disposal Co.
Oil recovered, plus a public service performed, have both proved profitable to the industry served.

ground of the new employees. The determination of necessary repairs and extensions, the organization of emergency working crew and considering the need for emergency chemicals and equipment are important adjuncts. Duplicating pumping units as well as emergency portable type pumps, chlorinators and lighting plants, fencing plant property, tentative police protection and flood-lighting are also under discussion.

An article by John S. Trevor of Middlesex, England, which has appeared in the June, 1940, issue of this magazine, is especially pertinent. The main problems in Great Britain are, first, the protection of key points, such as pumping stations, power houses, control centers and laboratories and, second, maintenance of the system during emergencies such as broken sewers and flooding underground railways. The necessity of repairing and maintaining or replacing damaged pumping stations and power houses, sterilization of contaminated water are some of the problems. Employees of public utilities are drilled for efficient emergency work.

Textbooks

The review should not be closed without reference to the excellent volumes produced during 1940 on sewage treatment problems and processes by Imhoff and Fair, Babbitt, and Keefer.

N. J. SEWAGE ASSOCIATION

Featuring an "All Operators Program"

FOR its two day annual meeting, March 20th and 21st, at Hotel Stacy Trent, Trenton, N. J., the New Jersey Sewage Works Association has planned it an "All-Operator Meeting," with nothing but plant operators on the program.

One operator from South Jersey, laying claim to "The Perfect Plant," is being put on the spot for a paper on this very topic. When he is exposed to "cross-questioning" on the floor he may have to change his topic to "The *Almost* Perfect Plant."

Another innovation on the program is that patterned after a popular radio program. The hour devoted to *"Sewage Information Please"* will find plant operators as experts being quizzed by any who writes his question on a slip of paper. If the "experts" are stumped the propounder of the question receives a cash award.

The usual exhibit of equipment and materials is being planned and also the popular "Speechless Dinner" will be repeated.

The "All Operators Program" lists the following topics and speakers:

Thursday, March 20

Registration.

Changing Contact Beds to Sprinkling Filters,
John Collom, Supt., Bordentown, N. J.

Problems Involved in Providing Chlorination at Atlantic City, N. J.,
George Cameron, Supt.

Some Recent Experiences in Operation of the Joint Meeting (Elizabeth), Sewage Treatment Plant,
Leslie E. West, Chief Engineer.

Lunch—

Operation of the Livingston, N. J., Plant,
John G. Albertson, Supervising Engr.

Aggravated Sludge at Rockville Center and How to Tame It,
C. George Anderson, Supt.

Carbon Dioxide as an Aid to Chemical Precipitation at Ridgewood, N. J.,
John Hood, Supt.

Report of Research Committee,
Weston Gavett, Consulting Engineer, N. Y. C.

Discussion of Matter of Joining the Sewage Works Federation, and Vote on Change of Constitution.

After Dark

Annual Speechless Dinner and Gala Entertainment.

Friday, March 21

Business Meeting.

Results Obtained from Operation of Sewage Treatment Plants in the Raritan Valley,
LeRoy Forman, Engineer, State Dept. of Health.

Experiences with Chemical Precipitation,
Louis Milani, Supt., Hasbrouck Heights.

Operating Experiences at the Manville Plant,
M. S. Kachorsky, Supt. of Public Works.

Lunch—

Sewer Line Maintenance and Equipment Therefor,
E. P. Decher, Joint Meeting, Elizabeth, N. J.

The Effects of Trade Wastes and Solids Concentration on Sludge Digestion at the Rahway Valley Treatment Plant,
Louis Fontenelli, Supt.

Breaking in of the Hamilton Township Plant,
P. N. Daniels and Lester Pope.

"Sewage Information Please"

Acceptable questions (from operators only) will be paid for at 50 cents and a bottle of chlorinated effluent.

For every accepted question which cannot be answered by a New Jersey Operator we will give the questioner $1.00 and a case of our New Jersey Sludge-digested, dried and chock full of vitamins.

Gadget Display and LAST ROUND UP!!!!!!

A SEWAGE WORKS FEDERATION IS BORN

A. S. Bedell

W. H. Wisely Appointed Executive Secretary and Journal Manager. Headquarters Office to be in Chicago. A. S. Bedell Becomes Vice-President. W. W. DeBerard Made Treasurer.

New York City Voted 1941 Convention, October 9-11

W. H. Wisely

ON January 15th in New York City members of the Board of Control of the old loosely knit Federation of Sewage Works Associations gathered from all parts of the country to participate in the best attended annual meeting ever held by the Board and to sit in at the birth of a reconstructed and strengthened Sewage Works Federation having national scope and subject to more centralized operations.

The new Constitution and By-Laws for the Federation that was offered by the Committee on Reorganization to the Board, while sitting in Chicago during the first and highly successful Federation Convention, October 5, 1940, had during the interim been revised by a special Motivating Committee to conform with resolutions passed by the Board during its Chicago meeting. This revision, which had already received wide circulation amongst officers of the several associations comprising the Federation, was offered to the Board on January 15th for discussion and action. This revised draft was considered article by article and section by section and, with one important amendment added by the Motivating Committee to meet demands from several of the member Associations, it was unanimously accepted by the Board. The Constitution and By-Laws are in many respects patterned after those of the American Water Works Association, which have been found to fit the needs of water works operators, engineers and others, so well. If one compares the two documents side by side the similarity in many portions is immediately evident.

Those sections of the Constitution and By-Laws which would appear to be of greatest interest to members and prospective members of the Federation, or its member Associations, are reproduced at the end of this report.

Chas. A. Emerson
New York
President

F. W. Mohlman
Chicago
Editor

The Motivating Committee Reports

The Motivating Committee, consisting of A. S. Bedell (chairman), W. W. DeBerard, Prof. Chas. Gilman Hyde, Dr. Abel Wolman, and W. J. Orchard (secretary), in a report following the adoption of the Constitution and By-Laws, presented, amongst other matters, the following recommendations for action:

(1) That Mr. W. H. Wisely be appointed Executive Secretary of the Federation and Manager of the Sewage Works Journal, his employment being on a half-time basis during the first year at least. That compensation for such services be set at $2500 per year. (Unanimously approved.)

(This recommendation being unanimously approved, the new Executive Secretary was introduced. Mr. Wisely has made a highly successful energizing secretary of the Central States Association. He was formerly employed as assistant engineer with the Illinois State Department of Health, and more recently has become Superintendent and Manager of the Champaign-Urbana Sanitary District. In this position he will continue until such time as the Federation is financially able to pay for a full-time Secretary-Manager.

(2) That a central headquarters office for the Federation be established in the Chicago area. (Approved.)

(3) That Dr. F. W. Mohlman be continued as editor of the Journal, working in cooperation with the Executive Secretary who will act in the capacity of Journal Manager. (Approved.)

(4) That every effort be made to make the Journal more attractive and interesting to the average sewage plant operator. (Agreed.)

(It should be explained that the management of the Journal conducted until now by The Chemical Foundation (New York City) at no cost to the Federation, will after March 31st no longer be available. After these years of Journal management, and underwriting the expense of its production, but with the end of this magnanimous support from the Foundation in sight for more than a year, the necessity for reorganizing the Federation and increasing membership dues to meet production and management costs of the Journal was becoming the more urgent. The necessity for doing something about the Journal, plus the many other considerations making an organization of national scope, desirable, made speed in consummating a reorganization a necessity.)

(5) That the next Annual Meeting and Convention of the Federa-

W. W. DeBerard
Chicago
Treasurer

W. J. Orchard
Newark, N. J.
Executive Comm.

tion be held in New York City, October 9th-11th inclusive, all arrangements to be handled by a Convention Management Committee of five members. (Approved.)

Manufacturers' Association's Participation

The Committee, through W. J. Orchard, acting for the Water and Sewage Works Manufacturers' Association, offered for consideration a proposal in which the manufacturer group offered to contribute $5,000 annually to the general funds of the Federation, such contribution to be used in any manner seen fit by the Federation Board.

In return the Manufacturers asked for the privilege of taking full charge of exhibits at the Annual Conventions of the Federation.

Approval of both was recommended.

After some debate the Board unanimously voted acceptance of the manufacturers' offer and granted full control of exhibits for the year 1941. Only the present year was acted on in view of the fact that the Executive Committee has been requested to determine more of the details and proceed to develop an arrangement between the Manufacturers and the Federation, on a mutually agreeable basis, for later consideration. This statement may not be correct to the letter, but in essence it expresses the idea that the Board had of proceeding a step at a time and avoiding permanent arrangements in any direction until more experience is gained by the Board in the matter of conducting conventions and in the general affairs of the Federation.

In regard to the income or profit made from the sale of exhibit space at the Chicago Convention, the question was raised as to what it amounted to. Mr. Orchard replied that booth rent collected, less expenses, netted the Manufacturers' Association (of which all exhibitors must automatically be members) a clear profit of $2,600. At the time the $1,500 was contributed by the manufacturers for the exhibit privilege the marked success of the initial convention was not anticipated and as it turned out the Manufacturers made on paper at least a profit. Likewise the Federation had made a clear profit resulting from the higher registration fees paid by manufacturers' representatives. On the other hand, if the $5,000 contribution had been in force the Manufacturers' Association would have shown a net loss of $2,400. What the net cost to the Manufacturers will prove to be for the year 1941, after deducting the profits from booth rental at the 1940 Convention, remains to be seen.

Since the Constitution calls for Manufacturer representation on the Board of Direction, by the appointment of three Directors-at-large from the Water and Sewage Works Manufacturers' group, Mr. Orchard offered the names of the following as having been selected by the manufacturers' Association.

L. E. Rein—Pacific Flush Tank Co.
D. S. McAfee—The Dorr Co.
W. J. Orchard—Wallace & Tiernan Co.

To the Executive Committee

Chas. Gilman Hyde
Univ. of California
Berkeley, Calif.

Wm. M. Piatt
Consulting Engr.
Durham, N. C.

To the General Policy Committee

Geo. J. Schroepfer
Chief Engineer
Sewerage Comm.
Minneapolis

H. E. Moses
Chief Engineer
State Dept. Health
Harrisburg, Pa.

L. L. Luther
Superintendent
Public Works
Freeport, L. I.

Harry R. Hall
Chief Engineer
Wash. San. Dist.
Hyattsville, Md.

L. H. Enslow
Editor
W. Wks. & Sew'age
New York

A. M. Rawn
Chief Engineer
County San. Dist.
Los Angeles

New Officers and Directors

The following were elected officers to serve through the 1941 Convention, October 9th-11th except in the case of the Directors.

President — Chas. A. Emerson, New York.

Vice-President—Arthur S. Bedell, Albany.

Exec.-Secretary — W. H. Wisely, Champaign, Ill.

Treasurer—W. W. DeBerard, Chicago.

Directors-at-large (from the Federation):

Langdon Pearse, Chicago (1 year).
Linn H. Enslow, New York (2 years).
A. M. Rawn, Los Angeles (3 years).

Directors-at-large (from the Manufacturers):

L. E. Rein, Chicago (1 year).
W. J. Orchard , Newark (2 years).
D. S. McAfee, New York (3 years).

Directors Chosen to Represent Member Associations

Where a blank appears in the Directors listed, the particular Association has not recorded the individual chosen as its representative on the Board. Until now each member Association has had two representatives on the Board of Control, without limitation on continuity of tenure. The new Constitution provides for but one Director, henceforth to be elected for a three year term and not permitted to succeed himself. The expiration of the term of each Director is indicated in brackets, such terms carrying through the Annual Meeting of the Federation (October) of the year indicated.

Association	Director
Arizona,	.....* (1943)
California,	Chas. G. Hyde (1941)
Central States,	Geo. J. Schroepfer (1942)
Dakota,	W. W. Towne (1943)
Federal,	A. P. Miller (1941)
Georgia,	G. R. Frith (1941)

Iowa, Max Levine (1941)
Kansas, Ernest Boyce (1942)
Maryland-Delaware, H. R. Hall (1942)
Michigan, N. G. Damoose (1943)
Missouri, George S. Russell (1942)
New England, F. W. Gilcreas (1942)
New Jersey, W. Rudolfs (1943)
New York, A. S. Bedell (1942)
North Carolina, W. M. Piatt (1943)
Ohio, F. W. Jones (1942)
Oklahoma, ...* (1941)
Pacific Northwest, J. W. Cunningham (1941)
Pennsylvania, H. E. Moses (1943)
Rocky Mountain, C. A. Davis (1942)
Argentina, ...* (1943)
Texas, ...* (1942)
Canadian, ...* (1943)
Inst. of Sewage Purification, ...* (1941)
Institution of Sanitary Engineers, ...* (1941)
*Not yet chosen.

Committees Established

The following committees were established, as called for in the new Constitution. The personnel of these committees represents selections made by the Motivating Committee, in conference with the President and the Vice-President of the Federation. After some questioning of a clarifying nature, the committees, as named, were approved by the Board.

Specifications, in brief, pertaining to the make-up of the several committees appear bracketed beneath the name of each. (For more details see the By-Laws.) The term Member-at-Large, may appear a little confusing, but is the designation applied to Active Members of the several associations comprising the Federation who are *not* members of the Board of Control.

Executive Committee

(The President and four Directors)
Chas. A. Emerson, Chairman.
A. S. Bedell (New York).
Wm. J. Orchard (Manufacturers).
Wm. Piatt (North Carolina).
Chas. G. Hyde (California).
W. H. Wisely, Secretary.

General Policy Committee

(The latest living Past-President as Chairman, three directors, and three Members-at-Large; at least three of the total number to be operators.)

Directors:
H. E. Moses (Pennsylvania)
Harry R. Hall* (Maryland)
Linn H. Enslow (New York)

Members-at-Large:
Carl E. Greeen (Oregon)
George J. Schroepfer* (Minnesota)
L. L. Luther* (New York)
*Operators.

Sewage Works Practice Committee

(The Editor and at least four Members-at-Large)
F. W. Mohlman, Chairman
J. J. Wirtz (Ohio)
Geo. H. Craemer (Connecticut)
Morris Cohn (New York)
Gail P. Edwards (New York)
B. A. Poole (Indiana)
C. E. Keefer (Maryland)

Committee Chairmen

Research
Dr. W. Rudolfs
N. Brunswick, N. J.

Publications
L. W. Van Kleeck
Hartford, Conn.

Publications Committee

(The Editor and at least four Members-at-Large)
L. W. Van Kleeck, Chairman
F. W. Mohlman, Editor
F. C. Roberts (Arizona)
Chas. Velzy (New York)
Rolf Elliason (New York)
James L. Ferebee (Wisconsin)

Organization Committee

(At least three Members-at-large)
H. W. Streeter, Chairman
Ernest Boyce (Kansas)
N. G. Damoose (Michigan)

Research Committee

(Chairman appointed by the Board, with power to name the Committee, consisting of at least five Members-at-Large)
William Rudolfs, Chairman

Budget for 1941

The final business brought before the new Board was the proposed budget for the year 1941, offered by the Motivating Committee but largely the work of W. J. Orchard as Chairman of Committee on Finance—an interim committee that handled the financing of the Chicago convention which put money in the Federation Treasury.

The budget shows for 1941:

Total estimated Expenditures	$20,925.00
Total estimated Receipts	19,650.00
Indicated (likely) Operating Deficit	$1,275.00

It was pointed out that expected receipts for 1941 had been conservatively estimated and expected expenditures liberally estimated, so that the actual deficit as of January 1, 1942, would hopefully run lower than the $1,275 anticipated. That, in any event, the Federation would have at its command the $5,000 contribution from the Manufacturers' Association on January 1, 1942, to maintain the Federation in a solvent condition by promptly erasing the deficit. Also, early in 1942 the increased price of the Journal (payable in advance) will become avaliable to meet the deficit created in 1941. It is further hoped, and expected, that advertising revenues to the Journal will increase under the new management and Journal plans. Looking ahead still further, it is conservatively estimated in the Report on the Budget that there should be a cash balance on hand by January 1, 1943, amounting to $3,000.

Some of the items of chief interest in the budget for 1941 follow:

Expense

(The Journal)

Mechanical (printing, engraving, paper, etc.)	$11,000
Editorial Expenses	1,400
Secretary's Salary (half-time)	2,400
Travel Expense	1,650
Office Rent	1,100
Stenographer and Clerk	1,375
Office and Committee Expenses	1,000
Reprints and Contingencies	1,000
	$20,925

Income

Advertising in the Journal	$ 7,500
Manufacturers' Contributions	5,000
Dues from Associate Members*	1,200
Income from Journal to members	3,750
Income from Journal to non-members	1,200
Sales of reprints and "Modern Sewage Disposal"	1,000
	$19,650

*New income from Manufacturer memberships.

Constitution and By-Laws

The following are excerpts from the new Constitution and By-Laws which would seem of interest to members and prospective members of the Federation.

What would seem to be of especial interest to the several Member Associations, wishing to encourage the least adequately paid of the sewage plant operator group to become members of their State or Regional Association, attend meetings, and in other ways participate in the advantages offered this group through short-schools provided and other varied advantages accruing, is the important amendment which permits an "Affiliate" grade of membership. This amendment, appearing under "Classification of Members" in the By-Laws, permits Member Associations to the Affiliate membership to operators in the lowest salary group. Dues charged such Affiliates will be set by the various Member Associations to meet the needs of the local

Association or Section of such Association. For these Affiliates no dues will be contributed to the Federation by the Member Association. In consequence Affiliates will not receive the Journal. This grade of membership, the Committee pointed out, must be carefully dealt with by Member Associations in order that the work of the Federation in behalf of this same group, along with others, may not be handicapped by a loss of revenue which may become serious when multiplied by the number of Associations which may have Affiliates. When an Affiliate becomes able to stand the full dues he is expected to become a full member with voting privileges, and a supporter of the Journal and the Federation through his contribution of the $3.00 per year. (We would also point out that the Affiliate grade of members in the American Water Works Association pay $5.00 yearly dues and receives only 4 of 12 numbers of the A.W. W.A. Journal each year. In the American Public Health Association the least membership dues is $5.00 per year—even for the lowest paid personnel in public health work. It would appear that the $3.00 base for sewage workers is about as reasonable as one could expect, even if he looks upon the contribution as a fee for the expected higher recognition for sewage works operators which the Federation has as one distinct and paramount aim.

Sections from the Constitution

Jan 15, 1941, voted unanimously with amendment permitting affiliate members.

Objectives

The objects of this Federation shall be: The advancement of fundamental and practical knowledge concerning the nature, collection, treatment and disposal of sewage and industrial wastes; the design, construction, operation and management of treatment works; the study, promotion and encouragement of improved sanitation of waterways; the correlation and strengthening of regional and state sewage works associations or conferences within or without the United States of America; the publication of a journal; and other relevant activities.

Officers and Board

The officers of the Federation shall be a President, a Vice-President, a Secretary, a Treasurer, and an Editor.

The Board shall consist of:

(a) The President of the Federation.
(b) The Vice-President of the Federation.
(c) The Treasurer of the Federation.
(d) One Director to be appointed by and to represent each Member Association.
(e) Six Directors-at-Large, of whom three are to be elected by the Executive Committee of the Sewage Works Division of the Water and Sewage Works Manufacturers' Association, and three by the Directors representing the Member Associations.
(f) The latest living Past President of the Federation.
(g) The Chairman of the Organization Committee.
(h) The Chairman of the Publications Committee.
(i) The Chairman of the Sewage Works Practice Committee.
(j) The Chairman of the Research Committee.

The President, the Vice-President, and the Directors of the Federation will not be eligible for reelection for consecutive terms.

Nominations and Elections

SECTION 1. The annual meeting of the Board in 1941 shall be held in January. Thereafter, it shall be held on the first Saturday of October in each year, or such other day in October as may mark the closing of the Annual Convention of the Federation.

At the annual meeting the Directors representing the Member Associations shall meet under the Chairmanship of the President of the Federation and shall by a majority vote of all such Directors, elect a President, a Vice-President, Treasurer, and one Director-at-Large. Absent Directors may vote by proxy. Any candidate so elected shall be an Active Member of some Member Association and shall signify willingness to serve. Any candidate elected as President or Vice-President shall at some time previous to such election have been a member of the Board of Control.

After the annual meeting of October, 1941, the term of each Director so elected shall be for three (3) years beginning with the last session of the Board immediately following his election.

SECTION 2. One Director on the Board of Control to represent each Member Association shall be elected by each Member Association.

From the By-Laws
Member Associations

SECTION 1. Any regional or state sewage works association or conference, or other organization whose objectives and constitution are in harmony with those of the Federation, may be granted membership in the Federation by a majority vote of the Board.

SECTION 2. Any Member Association may withdraw from the Federation at the end of any fiscal year by giving three months' notice of such intention.

SECTION 3. Any Member Association may be excluded from this Federation at the pleasure of the Board.

ARTICLE II

Classification of Members

SECTION 1. Membership of the Federation shall be composed of Member Associations, Honorary Members, Associate Members, and Sustaining Members. Membership of the Member Associations shall consist of Active Members and Corporate Members only.*

*Now amended to include Affiliates.

SECTION 2. An Active Member shall be a superintendent, manager, operator, or employee of a sewage or industrial wastes system or treatment works; a professional engineer; a chemist, bacteriologist, biologist, or any qualified person professionally engaged or interested in the advancement of knowledge relating to the disposal or treatment of sewage and industrial wastes or improved sanitation of waterways.

SECTION 3. A Corporate Member shall be a Sewage Board, Department or Commission; Sanitary District; Department of Public Works handling sewage; National, State, District or Municipal Board or Department of Health; or other body, corporation or organization engaged or interested in at least one of the stated objectives of the Federation and shall be entitled to one representative whose name shall appear on the roll of members and who shall have all the rights and privileges of an Active Member. This representative may be changed at the convenience and pleasure of the Corporate Member.

SECTION 4. An Honorary Member shall be a person of acknowledged eminence in one or more fields of activity within the scope of the state objectives of the Federation. Candidates may be nominated by any Member Association but can be elected only by a majority vote of the Board. There shall not be more than ten living Honorary Members at any time.

SECTION 5. An Associate Member shall be a person, firm or corporation engaged in the manufacturing or furnishing of supplies, materials, or equipment for the construction, operation, or maintenance of sewerage works and shall be elected by affirmative vote of a majority of the Board after consideration of written application duly made to the Secretary.

SECTION 6. A Sustaining Member shall be an individual or a corporation interested in the general objectives of the Federation.

As amended.

SECTION 7. Member Associations may have a grade of members known as Affiliates and comprised of sewage plant operators and maintenance men in the lower classifications or in the smaller communities. For this grade of member the Member Association will make no payment to the Federation and such Affiliates will not receive the Journal. Affiliates may become full members, at any time, by paying full membership dues.

(The above may appear in the printed By-Laws in a bit different wording but the general sense of the amendment passed is as stated.—Ed.)

Dues

SECTION 1. The dues established by Member Association, as applied to their members, shall be as determined by the Member Association.

SECTION 2..

(a) The dues paid by the Member Associations to the Secretary of the Federation shall be Three Dollars per annum for each Active Member in the Member Association. (NOTE: For the calendar year 1941 dues for all Active Members will remain at the $1.50 as fixed by the old By-Laws. On January 1, 1942, the $3.00 rate becomes effective.)
(b) For each Corporate Member the annual dues shall be Ten Dollars.
(c) For each Sustaining Member the annual dues shall be not less than Twenty-five Dollars.
(d) For each Associate Member the annual dues shall be Twenty Dollars.
(e) The dues for Member Associations outside the United States of America and its territorial possessions shall be greater than the amounts hereinbefore specified by an amount to be fixed annually by the Board as equivalent to the added cost for mailing the Journal to such associations.

Duties of Officers and Directors

SECTION 3. The Board of Control shall be the legal representative of the Federation, and as such shall manage its affairs subject to the conditions and limitations prescribed in the Constitution and By-Laws; direct the investment and care of funds of the Federation; make appropriations for specific purposes; appoint employees and fix their compensation; take measures to advance the interests of the Federation; and generally direct its business. The Board shall not incur indebtedness beyond the funds in the hands of the Treasurer and the Secretary. The Board shall hold a meeting during the Annual Convention. Other meetings shall be held at the call of the President, or on petition.

At the Annual Meeting the Board shall appoint a Secretary to serve for a term of two years, and an Editor to serve for a term of three years, unless removed for cause by the Board.

SECTION 4. The Treasurer shall have charge of the funds of the Federation and custody of its investments, if any. He shall pay bills against the Federation when certified by himself and the Secretary. He shall make a report for each calendar year at the Annual Meeting of the Board.

He shall be bonded at the expense of the Federtaion and to an amount to be determined by the Board.

SECTION 5. The Secretary shall be an Active Member and under the direction of the President and the Board of Control, shall be the executive officer of the Federation. It shall be his duty to attend all conventions and meetings of the Board, prepare the busi-

ness and duly record the proceedings thereof. He shall see that all monies due the Federation are carefully collected and without loss transferred to the custody of the Treasurer. He shall scrutinize all expenditures, shall certify to the accuracy of all bills and vouchers on which money is to be paid, and shall countersign checks drawn by the Treasurer against the funds of the Federation when such drafts are known by him to be proper and duly authorized by the Board. Once every three months he shall forward to each member of the Board a financial summary of receipts and disbursements, and at the annual meeting of the Board shall present a balance sheet of his books as of the 31st of December and as of the 30th of September preceding the meeting, together with a report of the activities of his office.

He shall have charge of the books and records of the Federation, including lists of members of the Federation and subscribers to the Journal. He shall have charge of the mechanical production and distribution of the Journal and other publications of the Federation, and shall handle all financial matters connected therewith.

He shall be bonded at the expense of the Federation, and to an amount to be determined by the Board.

The books of the Federation shall be audited annually at the expense of the Federation by public accountants to be appointed by the Board.

SECTION 6. The Editor shall be the literary agent of the Board and shall receive all manuscript copy and prepare it for publication. He shall have the authority to return to the author for correction, or to reject entirely, any manuscript which may be in bad condition, illegible, or clearly deficient in respect to composition, subject matter or supporting data, or otherwise conspicuously deficient or unfit for publication. He also shall have the authority to reject any manuscript which is designed to promote commercial interests. He shall be a member of the Publications Committee and of the Committee on Sewage Works Practice. Decisions of the Editor relative to rejection of manuscripts shall be subject to appeal to the Publications Committee.

Conventions

The Annual Convention of the Federation shall be held at a time and place to be selected by the Board, preferably in the month of October.

Each member and guest present at any of the conventions of the Federation shall pay a registration fee of such amount as may be determined by the Executive Committee.

Committees

SECTION 1. There shall be an Executive Committee of five members consisting of the President and four Directors. This committee shall be chosen by the Board at its annual meeting. The President of the Federation shall be Chairman, and the Secretary of the Federation shall act as Secretary of the committee. In the absence of the President, the committee shall choose a temporary Chairman from its members. The duties of this committee shall be to direct the administrative work of the Federation and carry out the policies of the Board between meetings of the latter. The Executive Committee shall present at the annual meeting of the Board a budget of estimated expenses of the Federation, including publications, for the ensuing years. On the adoption of the budget by a majority vote of the Board, the expenses of the Federation shall be limited, as far as may be practicable, within the amounts prescribed in the said budget. A quorum of the committee shall be three members.

SECTION 2. A General Policy Committee of seven members consisting of the latest living Past President, who shall serve as Chairman, three Directors and three Members-at-Large, appointed at the outset for terms of one, two, and three years, and thereafter for three-year terms, shall be appointed by the Board at its annual meeting. Three of the seven members of the committee shall be operators of sewerage systems or sewage or industrial wastes treatment plants.

The committee shall study and recommend to the Board upon matters of general policy affecting the well-being and usefulness of the Federation and its Member Associations; matters of public relations; the advancement of the professional and social status of members, and such other matters of similar nature as shall be referred to it by the Board.

SECTION 3. A Publications Committee shall be appointed by the Board at its annual meeting. It shall consist of the Editor and at least four additional Members-at-Large. Its Chairman shall be, ex-officio, a member of the Board. The Publications Committee shall arrange the technical programs for the annual convention of the Federation and shall have general supervision of the publications of the Federation and of the performance of contracts and expenditures connected therewith. The committee shall prepare general rules which, after approval by the Board, shall control the preparation, presentation, acceptance and publication of papers and shall have general supervision of such other matters of similar nature as the best interests of the Federation may require.

SECTION 4. An Organization Committee of at least three Members-at-Large shall be appointed by the Board at the annual meeting, and its Chairman shall be, ex-officio, a member of the Board. The Organization Committee shall examine and report to the Board on application for membership in the Federation and also shall serve in the encouragement of the formation of new regional or state associations or conferences eligible for membership, as well as serving in an advisory capacity in other matters of a similar nature as the best interests of the Federation may require.

SECTION 5. A Sewage Works Practice Committee consisting of the Editor and at least four Members-at-Large shall be appointed by the Board at the annual meeting, and its Chairman shall be, ex-officio, a member of the Board.

Any resolution, report or publication which undertakes to establish in the name of the Federation, professional or technical standards shall be submitted to this committee, and it shall direct such matters on behalf of the Federation.

It shall give notice by publication to the membership of all such proposed standards and report its approval or disapproval of such to the Board.

It shall appoint such sub-committees as it may deem necessary properly to carry on its work.

SECTION 6. There shall be a Research Committee of at least five Members-at-Large. The Chairman shall be appointed by the Board, and the other members of the Committee may be appointed by the Chairman, by and with the consent of the President of the Federation. The Chairman shall be, ex-officio, a member of the Board.

The Research Committee shall be charged with the duty of stimulating and coordinating research work among the various Member Associations, and of cooperating with other organizations in the promotion of research work.

SECTION 7. The Board shall appoint such other committees as may be necessary to carry on the work of the Federation.

SECTION 8. The reports and recommendations of all committees of the Federation shall be subject to approval by the Board.

SECTION 9. Members-at-Large are Active Members who are not members of the Board.

Publications

All publications of the Federation shall be issued under the direction of the Board and shall be copyrighted as far as is practicable and proper.

MORE LIGHT ON WATER WORKS STRUCTURES

May Prove to Be That Ounce of Prevention

A number of cities have already laid plans for the protective lighting of water works properties, as a measure of preventing possible sabotage. In this picture John Burwell, Sup't. of Water at Schenectady, N. Y. (left), is discussing exterior plant lighting with R. J. Swackhamer, "G. E." engineer. At the right can be seen one of the luminaries of the protective lighting system to be installed for Schenectady.

YOUTH TAKES A LOOK AT AMERICA'S WATER AND SEWAGE FACILITIES

And Many a Parent Learned Things That They Never Before Understood or Appreciated

By NANCY WALKER*
Camp Fire Girls, Inc.

Chapter I. Youth Studies Water Supply

Here is an article that should serve as a worthy pattern and something of an inspiration to those connected with municipally operated public utilities of every community. It strikes us that the smaller the community the more valuable can prove to be the type of thing that has been undertaken by the Camp Fire Girls of America.

Almost every community has youth organizations of one or another sort and much good may be predicted for the spread of the investigations and studies of water supply and sewerage facilities made by organized and directed youth—girls or boys. "Good Housekeeping" in the home town appeals naturally to young ladies, but the boys will find as much to interest them (and their parents also if the topic comes in for conversation at home, as it should) in the water supply and sanitation situation in their home town. Perhaps, too, they can brave sewerage investigations better than the gentler sex.

Every reader of Miss Walker's suggestive article should make it a point to see that the general idea receives the attention it deserves. In this direction we wish to point out the effectiveness of the editorial comments made concerning the investigations made by the Camp Fire Girls of Sault Ste. Marie in the local newspaper; also to the betterments attained in other communities.

It seems proper to suggest to readers that this article be brought to the attention of all who may be in a position to carry forward the laudable job of interesting youth in water supply and sanitation of the community. In furthering this movement we believe that there is no better place to start than with the home-town editor. This article is one which we believe this moulder of public opinion and instigator of movements of community benefit will clearly comprehend the significance of, and so comprehensively put in the statement which appears at the end of the article.—L. H. E.

When you turn on the faucet, did you
you ever stop to think
Of all that happens to the water that
you drink?
Did you think of the pipes, of the
plant, of the source,
And of life without water? Which is
hopeless, of course.

Well, the Camp Fire Girls decided to
find
The facts about water, and to clear
up their mind.
So one day they hopped on a trolley
so nice
And came to the water works in only
a trice.

They were met at the door by some
very nice men,
Who were awfully polite and invited
them in.
Superior girls, intellectually inclined,
They asked lots of questions and
knowledge did find.

For this bit of verse, credit should go to a group of Camp Fire Girls in St. Paul, Minnesota, who presented the results of their research on water supply in a clever skit called "The Ballad of the Water Works." All over the United States, the older Camp Fire Girls have been finding out how their city keeps house, how it manages to provide everyone with enough pure water, and what it does with all the wastes. Through personal interviews with officials and long tours of exploration, the youngsters dug out the facts behind the water supply, gas and electric supply, and sanitation facilities in their own communities. This was all done under what was termed the Camp Fire Girls' "City Housekeeping" Project.

Illustrated albums recording their findings and recommendations, (many seemingly sound) now on display at the National Headquarters of the youth organization in New York. The best "City Housekeeping" reports, according to the judges, were received from groups of girls in the following communities: Berkeley, California; East Detroit, Michigan; Sherman, Texas; Sault Ste. Marie, Michigan; St. Paul, Minnesota; and Rio Hondo County, California.

Heading the distinguished judging committee was Mrs. Mary Beard, hisotrian and author. Other judges included Dr. Thomas J. Parran, U. S. Surgeon General, and Miss Katharine Fisher, Director of the Good Housekeeping Institute.

"The Camp Fire Girls have started off well in their study of public utilities," Mrs. Beard declared, commenting on the youngster's success. "Their City Housekeeping albums are evidences of close observation and careful listening to explanations given them by the officials in charge. They have presented their findings with skill in drawing and writing, supplemented by photography. On the basis of this exploration and the evident interest it awakened in them, they may follow the course of public criticisms of these utilities, new proposals for improved services, and the operations of all agencies and devices for better municipal housekeeping in the future, with the intelligence of maturity. This project has also been highly justified, it seems to me, in the popular interest it has aroused, helping to make the elders more city-housekeeping-minded."

Miss Fisher considered the project "one of the most effective ways

*Director of National Publicity, Camp Fire Girls, Inc., New York City.

of stimulating youth to think about community services and their administration, and the social and economic problems involved."

Youth's Interest a Real Asset

The judges weren't the only ones to wax enthusiastic about the project. Local advisors to the youthful investigators, including utilities' officials, city leaders and educational experts, were all emphatic in their praise for the way in which the girls tackled the problem. As one official remarked, *"If only more of the coming generation would interest themselves in these things, a number of the ills that beset the country today would soon eliminate themselves."* (The italics are ours. —Ed.)

Mother's problems seem a cinch compared with the headaches which plague the city, the Camp Fire Girls decided. Many of them found, too, that their community was in need of some housekeeping hints. In more than one case the girls' detective work uncovered a way in which they themselves could help make the city a healthier, safer place. All the youngsters were amazed to learn just what was being done for their own personal welfare and comfort. An before they were through, they could tell their "Dads" things these men never understood before.

It was fun finding out how the city keeps house, the girls reported. But besides all the good times they had along the way, the knowledge they gained about water supply will lead them to make better use of it personally and to help make it more efficient for the whole community.

An Editor Hits a Bull's-eye

Camp Fire Girls in Sault Ste. Marie, Michigan, reported to the Kiwanis Club on their City Housekeeping research, and thereupon commented local newspapers editorially: "If a candidate for city office wanted a platform of activities, he would find splendid material in the recommendations of these girls, who visited the pumping station, the city dump, the gas manufacturing plant, the electric light plant, and discussed municipal affairs with various department chiefs."

These Michigan youngsters contrasted conditions in the early days with the present-day water system. "Formerly," they explained, "School children went to the St. Mary's river for a drink of water at recess time. A few people had wells of their own, but many of the residents purchased water at the rate of twenty-five cents a barrel. This water was dipped from the river and hauled in pork barrels covered with burlap to keep the water from splashing out. Lack of sanitary equipment and methods of handling the water supply was probably responsible for outbreaks of cholera and other intestinal disorders. Over one hundred residents died during one epidemic of cholera." This unhealthy system is a dramatic contrast to the city's modern water supply, which the children describe as so pure chemically that four of the largest battery companies have reported it satisfactory enough to use in auto batteries in place of distilled water.

Incentive Created at the Top

Camp Fire Girls from seven different towns in Rio Hondo County, California, cooperated on the project, and, by bringing to a focus certain things learned, achieved some very practical betterments. As a result of the girls' questionings, the officials in one town had it impressed on them that they faced the danger of a real emergency because of water shortage, so they are now doing something about it. Research of the Camp Fire Girls brought to light the fact that the rate of water consumption in the town was rapidly increasing. The need for a more ample supply of water became apparent, and a new aqueduct to serve this town will be ready for use in 1941. Of course it would be absurd to claim that the youngsters were responsible for the new system now under construction, but their study helped bring to public attention the need for it and resulted, without much question, in more prompt action by the City Fathers than otherwise would have been the case.

In their tours and interviews, the Camp Fire Girls looked for the answers to many questions about water supply. For example, they asked—Where does the water come from? How is it purified or treated? How is it distributed? How long will the "ready to serve" supply last? How is it measured and charged for? What kinds of equipment are employed? How is water being used to conserve other natural resources? How to read water meters and turn off the water in one's own home? How the public can avoid wasting water? What can be done to improve the water supply system to make life healthier and safer?

The Cheapness of Water Impresses Youth

St. Paul girls were particularly impressed with the relative cheapness of water. "Water costs so little," they declared, "but could you afford to be without it at any price? Do you remember how your grandparents lugged the water they used?

Honorary Memberships to Two Outstanding "City Housekeepers"

Camp Fire Girls presenting to Newbold Morris, President of the N .Y. City Council, a silver membership badge for having been adjudged one of the "most outstanding City Housekeepers of the Nation." Mr. Morris had just announced the winning groups in the girls "City Housekeeping Project." Looking on is Miss Alice Bowman with Mr. Lester Scott, National Executive of the Camp Fire Girls, while Marjorie Petersen fastens the pin to Mr. Morris's lapel. Mayor LaGuardia was accorded the same honor.

Learning About Meters

And how to turn off water, gas or electricity in emergencies is an important part of the Camp Fire Girls "City Housekeeping Project." These young ladies are Minneapolis members.

[When these comely lassies grow up they will not be like the school-teacher who, upon seeing a puddle of water beneath her meter, and observing the sweat beads on the meter case, lost no time in notifying the water company that she had discovered her meter leaking badly and would certainly not pay for the leaking water, because it was "simply oozing through the meter all over." In addition, she was worried about the leaks getting worse and flooding the cellar.—Ed.]

Now it is easy to turn a water faucet and get any amount of pure water for the garden, the lawn, the bath, drinking, washing, cooking, and many other uses."

Frequently, the girls were full of praise for their water system. In Fargo, North Dakota, they confessed to "examining everything for weaknesses and looking hard for faults to correct." But a thorough search revealed spotless cleanliness and the only possible flaw which the "sleuths" could uncover was a little water bug found in the water before filtering. These girls did make one interesting discovery, that a bottled beverage known as "Pokegama" spring water, which was on sale at quite a high price at a corner grocery, was nothing more than lake water, obtained from Detroit Lake in Minnesota.

But, Conservation Is Stressed

Problems of conservation were of particular interest to Sherman, Texas, Camp Fire Girls. They explained that tree planting is an important aid to conservation because the branches break the force of hard rains and the root network of the trees hold the water down under the ground and keep it from washing away valuable soil and cutting gullies. "If farmers would strip crop and terrace their land," these young people proposed, "it would conserve both the water and the soil, and if they would plant grass water-ways in the natural drain of the field, it would also be an effective method of preventing soil erosion." Pointing out that water should never be allowed to drip in the winter because it is wasteful and doesn't prevent freezing, the Texas girls computed that in Sherman it would cost seventy-five cents and hour to leave the faucets dripping.

Mayor and Council President Honored

Officiating as an outstanding City Housekeeper, Newbold Morris, President of the Council of the City of New York, announced the winners of the City Housekeeping project. Immediately after his announcement, he was surprised with a special honor from the Camp Fire Girls who presented him with a silver membership pin and named him and Mayor LaGuardia as amongst "the most outstanding city housekeepers of the nation."

Congratulating the Camp Fire Girls on their project, Mr. Morris stated: "Housekeeping is often said to be a dull and unromantic subject. As Mayor LaGuardia has taken the lead in dramatizing City Housekeeping and given it an appeal which it never had before, so these Camp Fire Girls have taken up the torch and while it is in their custody, the fire which was kindled by our Mayor will never be quenched."

Mr. Morris gave a delegation of New York Camp Fire Girls a behind-scenes glimpse of city government in action when he took them to a fiery session of the City Council, which voted the youngsters "the courtesy of the floor."

Chapter II. Youth Surveys the Sewage Problem

In Which Camp Fire Girls Find Out Who Takes Care of the Spent Water Supply—More Importantly Who Doesn't

Most citizens know very little about the city's job of disposing of the "used water" supply. Last year the Camp Fire Girls determined to investigate this problem, as they had the water supply situation. This part of the "City Housekeeping Project" was likewise a nation-wide survey and study. Five hundred girls, fifteen years of age and older, took part in the project, designed specially for the older members of the organization, which has a total membership of over 275,000 youngsters between the ages of ten and eighteen.

Visits through sewerage plants and talks with operators, managers and city officials gave these young people a remarkably clear picture of just how well or how inadequately their home towns keep house. In their final reports, submitted to National Headquarters in illustrated albums, the girls described just how wastes were disposed of. They found out what precautionary measures were taken in the disposal of waste to protect community health. Further than that, they inquired whether these wastes were being converted into any useful products. They concerned themselves with the

Camp Fire Girls Inspect the Water System of Compton, California
Pointing out some of the details and answering many questions are three Compton officials: left to right, John Boardman, Assistant City Engineer; Roy O. Adams, City Treasurer, and The Mayor, Leroy Aylmer.

problem of how each citizen could help improve the work of the sanitation and sewerage department and how the community's wastes affected surrounding natural resources. Ills that beset the country today would soon eliminate themselves, because of the intelligent understanding of community problems that would result.

Arousing Citizens to Needs Considered a Duty

In several cities the youngsters were surprised to discover the existence of serious sewerage problems, and immediately began a campaign for reform. Camp Fire Girls in Spokane, Washington, prepared a challenging analysis of the situation. They reported in part as follows:

"Surprising, isn't it, how little we know about the way our city takes care of waste material? Such a simple question as 'Where is waste taken for disposal?' puzzles most of us.

"The answer to such a question should be a part of the knowledge of every citizen and, therefore, every future citizen. So we decided to find out the workings of our sewage disposal system. We were all vaguely aware of the discouraging fact that Spokane as a whole doesn't seem to care much whether the sewage is dumped into the river where many swim. They say 'It doesn't matter. I don't swim in the river very much.' Spokane doesn't realize how serious the situation is and she won't until a typhoid epidemic comes along, unless someone wakes her up. So that is what we can work for, to arouse Spokane to her need.

"There has been a good deal of publicity about sewage disposal in Spokane because twice they have tried to raise money for a plant, but the city is indifferent to all proposals. The city engineer told us many surprising facts in an interview we arranged with him. He said that there are twenty-seven large trunk sewers which are pouring filth into the Spokane River.

"What is really needed is a Sewage Disposal Plant costing about $600,000, where the solids brought in by the sewers would be taken out in a sedimentation tank and the water allowed to pass on. These removed solids would either be burned or digested by bacteria, during which process a gas similar to natural gas is produced as a valuable product for heating buildings and running power generating engines. The digested solids, after producing the valuable gas, is useful and safe material for gardens and lawns as a fertilizer and soil improver.

"Perhaps one reason why Spokane people don't realize the seriousness of the problem is that none of the sewer outlets is readily visible. However, we Camp Fire Girls can help. We can urge our parents, neighbors and adult friends to agitate for better sanitation. Perhaps a demonstration of the disease germs brought into the river would arouse some action. If every Camp Fire Girl in the city had persuaded her parents and friends to vote at the last election, very probably the new sewage plant would have been started by this time. If everyone does his part and does it well, we can have a clean city."

Cleaning Up East Detroit's "Back Yard"

Unsatisfactory conditions were also brought to light by the East Detroit, Michigan, Camp Fire Girls —another group cited for their attainments and report. "Until last year," they explained, "the citizens were allowed to use outside toilets, but we succeeded in having them abolished, and now every house must be connected with the sewer, or have a suitable septic tank. All outhouses are taboo. Back of Crescentwood is the old county ditch, into which at one time, the septic tanks drained and finally reached the river. To date this is still open, carrying enough germs to wipe us off the map. The Camp Fire Girls have already called attention to this fact, and we hope to carry it further; and, if need be, appeal to the State Board of Health for help."

Girls in Butte, Montana, found that their home town needed a sewage disposal plant, but was hampered because of its financial state. They pointed out many improvements which should be made in the sewerage system. The installations in the old buildings were in a bad state for want of repair, they declared. "Citizens could help," the young people added, "by inspecting their own homes to see that the plumbing joints are tight, thereby preventing sewer gas from escaping. They can guarantee their health by calling in a plumber to see that there are no gas leaks, and that all plumbing joints are properly trapped for back pressure. Every home should have a stop gate between the main and the home."

Berkeley, Calif., Has Its Problem

Berkeley, California, is another community with a sewerage problem, the Camp Fire Girls learned. In Berkeley the small sewer lines all run into one big sewer which travels about a mile out into the

Bay. The problem is to dispose of the sewage in such a way that the incoming tide will not bring back with the water that very same debris which has supposedly been discarded. The girls concluded that about the only way this problem could be solved would be to run the outlet sewer farther out into the Bay or to put the wastes through a treatment plant or at least some method of filtering out the solids which cause the trouble at Berkeley. The citizens of Berkeley, however, feel that the taxes required to remedy this situation would be too high at present.

Visits to local sewage disposal plants became real adventures for the Camp Fire investigators. Sherman, Texas, girls admitted that the odor in their plant "was not exactly pleasant," but they saturated their handkerchiefs with perfume and managed very well. They were specially impressed with the engine and blower room where the roar was so great that they clapped their hands to their ears. They were told that these were the engines by which compressed air is pumped into the waste material to oxidize and purify it.

After admiring the complexity and efficiency of their sewage plant, the Fargo, North Dakota, girls were still a bit astonished when informed that the first glass of water to pass through the purifying apparatus was drunk by their Mayor with no ill effects.

Camp Fire Girls in Sault Ste. Marie, Michigan, made an interesting comparison of the sewerage system as it used to be and as it is now in their particular community. "In the past," they pointed out, "our sewerage system was quite a problem. Before permanent systems could be built or old sewers repaired, many swamps had to be drained. Financial difficulties and the necessary haste to get them built caused a number of sewers to be constructed carelessly. Materials were more expensive then and the special equipment needed for the construction was not obtainable. Now many of these poorly built sewers have to be remodeled. Most of the swamps which were such a hindrance in the past have been drained. Working and building conditions are much better now.

"With the exception of one district of the city, nearly every house is on the complicated sewerage system. Complaints are investigated immediately and repairs are made as quickly as possible. Often the workers are handicapped by lack of details from people making complaints. In the one district where there is no adequate sewage disposal, it is believed that this condition has played a large part in the recent epidemics of influenza and other contagious diseases. Unless sewers can be built, the Board of Health may require the residents of that district to put in better septic tanks."

A distinguished group of judges examined the Camp Fire Girls' "City Housekeeping" reports carefully and awarded top honors to groups of girls in the following communities: Berkeley, California; East Detroit, Michigan; Sherman, Texas; Sault Ste. Marie, Michigan; St. Paul, Minnesota; and Rio Hondo County, California.

As in the case of the "Good Housekeeping Project" of studying and reporting on water supply, heading the judges was Mrs. Mary Beard, historian and author. Other judges were Dr. Thomas J. Parran, U. S. Surgeon General, and Miss Katharine Fisher, Director of the Good Housekeeping Institute and an authority on home safety.

Dr. Parran praised the "effective exploration" done and the generally good comprehension which the girls had obtained of the public health functions of their municipal government. Miss Fisher considered the project "one of the most effective ways of stimulating youth to think about community services and their administration, and the social and economic problems involved."

Results of Such Projects; Today-Tomorrow?

Results of this research are summed up in a letter from J. I. Hennessy, personnel examiner of the East Bay Municipal Utility District, Oakland, California, who writes as follows: "It is my opinion, as well as that of our Board of Directors, that congratulations are to be extended for the splendid way in which the Camp Fire Girls entered into the various phases of their 'City Housekeeping' project, and for the keenness and intelligence with which they were able to grasp the means by which their city lives."

[It was Mr. Hennessy, too, who made the earlier statement, italicized by us for emphasis, and now to be repeated. This we do because it says so much that is seemingly true and worthy of every bit of consideration and promotional effort that youth organizations can give in fostering the type of projects which Camp Fire Girls, Inc., has so fruitfully initiated on a nation-wide basis.

Mr. Hennessy's important closing comment was this: "If only *more* of the younger and oncoming generation would interest themselves in these things, a number of the ills that beset the country today would soon eliminate themselves. This, because of the more intelligent understanding of community problems that would result."—Ed.]

DO YOU WEIGH YOUR ASHES?*

Probably your ashes weigh more this year than they did last. Or, do they weigh less? Have you ever weighed the ashes that drop through the grate bars of your furnaces?

Without giving it much thought it may seem like a ridiculous thing to do, because, of what value are ashes? We are usually told to weigh the coal burned and to keep a strict account of all water used in the boilers so as to determine whether or not we are getting the same good grade of coal that we always got. That is true, but a simpler method is to weigh the ashes. It is the ash content, usually, that determines the calorific value of a coal. Very often coal from the same mine shows a widely differing ash content, therefore it is logical to keep tab on the refuse because the refuse costs just as much per pound as the good combustible matter.

It is quite possible, also, that a little experimenting along this line will do your plant some good. Try different coals of the size suitable for your furnaces and grates and the one with the least ash content which sells at a low price should show pretty good results. Later this can be "double checked" by noting how well the coal evaporates the water. It is not difficult and it may be worth while to work out a simple method of this kind that will tell you, year in and year out, just how well your coal and your boilers are performing.

*Contributed by W. F. Schaphorst, M.E., Newark, N. J.

ACCELERATED CLARIFICATION*

In Water, Sewage or Industrial Waste Treatment

By F. J. Lammers
Ass't Technical Director,
International Filter Company,
CHICAGO, ILL.

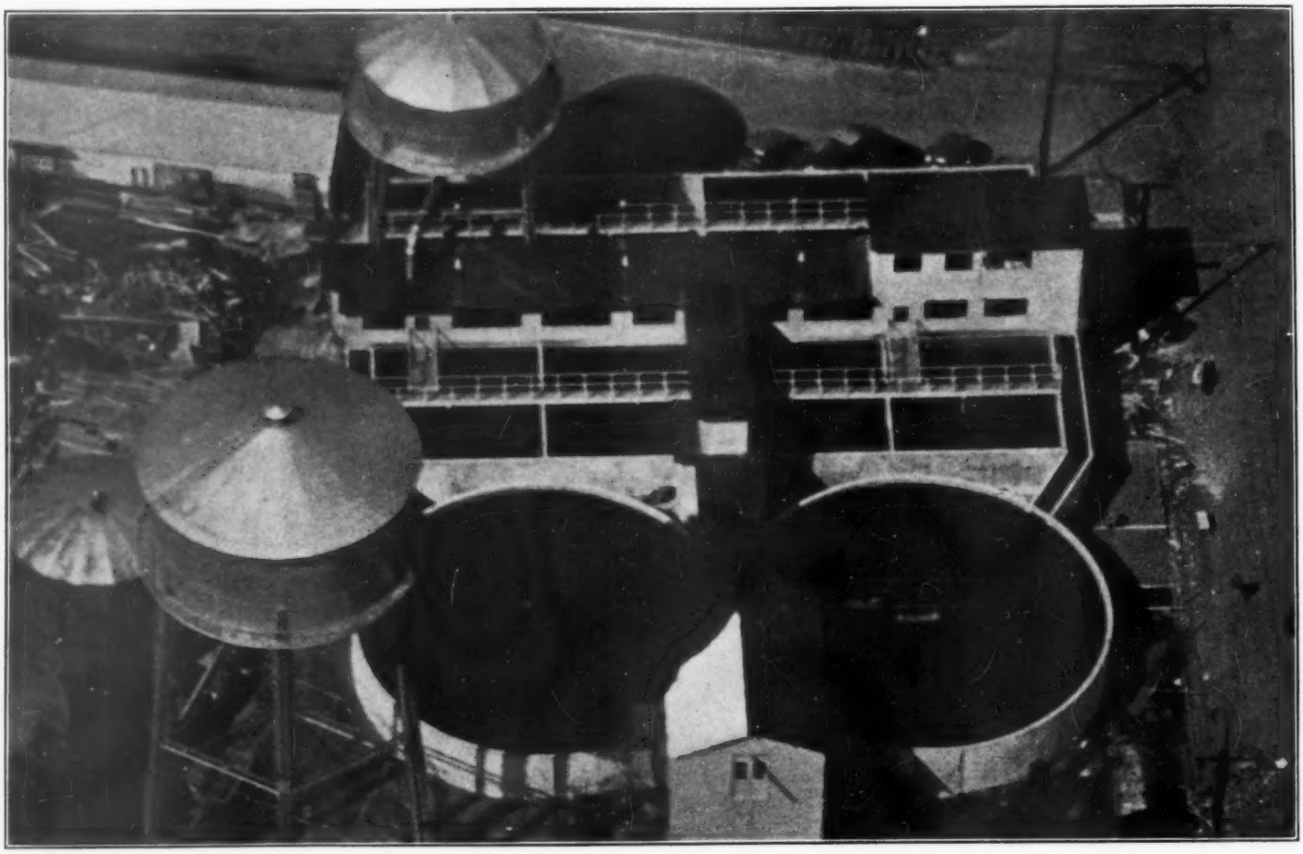
Clarification, in the sense of preparing water for filtration by coagulation and removal of a maximum amount of suspended matter, is one of the most important functions of water treatment. The development of compact, high rate equipment for lime softening naturally focuses attention on the possibilities of obtaining the same advantages in the coagulation and removal of turbidity, suspended matter, color and other coagulable organic matter. This particular field is of special significance in New England, where surface supplies are characteristically soft, comparatively low in turbidity and suspended matter, and frequently colored or otherwise evidencing organic matter.

*This paper, presented before the New England Water Works Association, is here reproduced by permission of the Association.

The Author

Successful results have been widely obtained with standard sedimentation basins of long retention time and the conventional methods of applying coagulant. Modern practice provides for an initial rapid mixing for most effective chemical distribution, followed by special forms of slower mixing for coagulation and development of a floc of maximum size. Characteristically, a considerable amount of space, equipment and basin area are devoted to means for distibution of chemical and floc building. It is common practice to provide special chambers equipped with mechanical agitators to provide rapid mix followed by decreasing agitation as the water progressed through the preparation stages to the subsidence basins. Rotating paddles or extensive baffle construction are used for the completion of floc development. Rectangular or circular basins of at least two and commonly four or more hours retention are provided for subsidence of the agglomerated materials—either with or without special sludge scraping and removal devices.

All variations of such plants follow a common principle of feeding the chemical coagulant to the water, mixing, flocculating and then set-



Typical of an Accelator Equipped Filtration Plant

Purifies heavily polluted Delaware River water for the Scott Paper Co. at Chester, Pa. This plant performing satisfactorily at 17 M.G.D. (designed for only 12 M.G.D.) required but 4,600 sq. ft. of ground space for the two combination conditioning and clarifying accelator units. That is to say, 83 per cent less area than the 27,000 sq. ft. computed for a modern mechanical flocculation chamber and conventional subsidence basins.

tling. Special adaptations and improvements in this series of process steps include proprietary equipment designs, many of which combine and coordinate the rapid mixing and slow flocculation equipment with improved means of settling the precipitated coagulant with its burden of impurities.

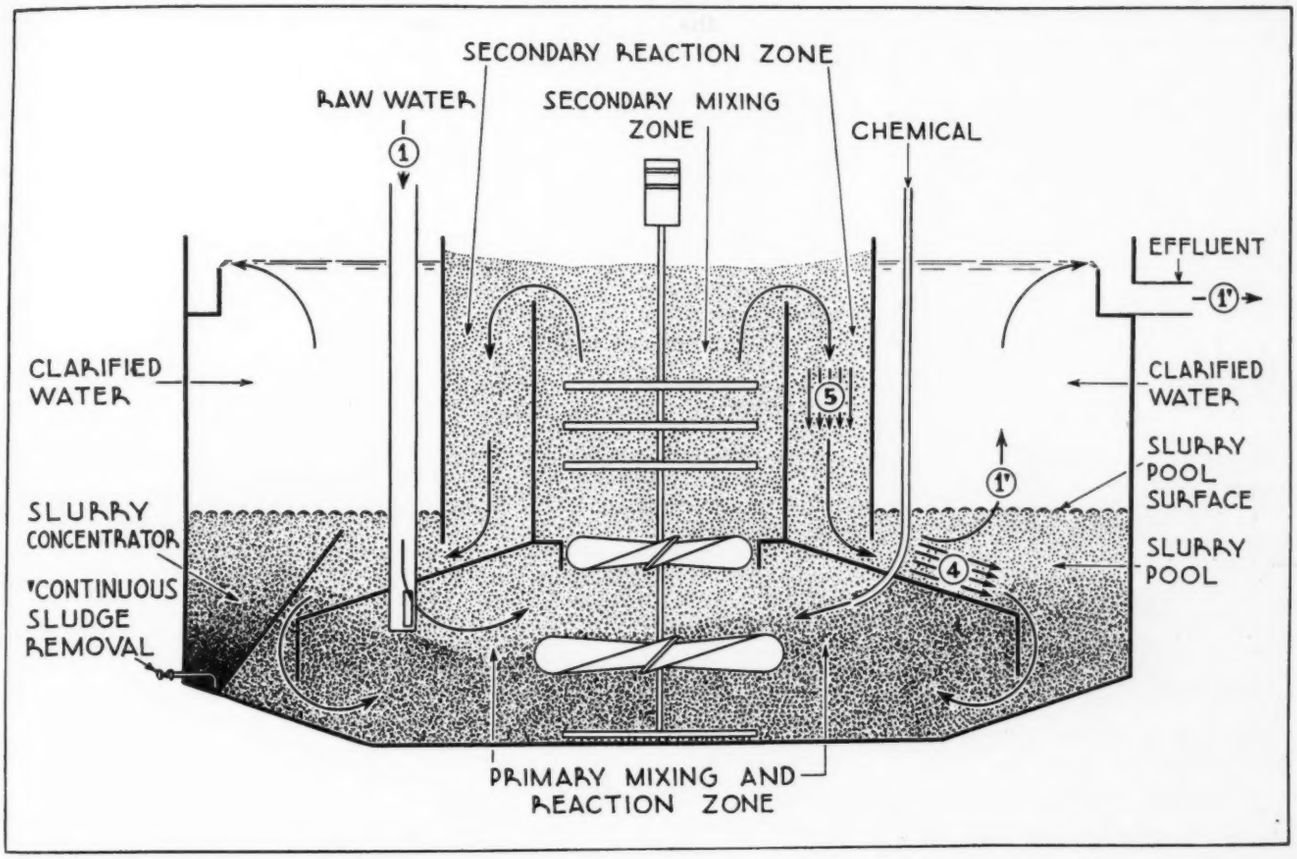
Combination Flocculating and Sudsidence Units

One of the adaptations is the placement of a central agitated mixing cylinder (open at the bottom) inside a standard, concentric, circular clarifier. The clarifier is equipped with a central discharge sludge scraper, and provides results typical of the standard circular clarifier. The design offered mechanical advantage in integral construction for both cogaulation and clarifying sections, plus some special blading in the mixing agitator. This had the purpose of retaining a portion of the floc in the center mixing zone, to assist in the development of new precipitate.

Another adaptation, still following the conventional steps of mixing chemicals and raw water, coagulating and then clarifying—directs the settling flow directly upward through a depth of previously settled sludge, referred to as a sludge blanket. In one of these the chemicals to be fed are first mixed with the raw water, which is then introduced at the bottom of a relatively high cylindrical settling basin through a radial pipe system for distribution of the treated or coagulated inlet water over the basin area.

This type of upflow basin, using a premixing chamber for application and distribution of chemicals to the inlet water, has been well described in the literature.[1, 2] The passage of the chemically dosed water up through the blanket of previously formed and settled sludge, affords opportunity for new, fine precipitate to be caught or screened out by adhesion, cohesion, or entanglements with consequent improved clarification. Sludge collection and removal are simplified by means of opening the bottom distribution piping to waste momentarily, sludging off the tank to the requisite degree to preclude over-accumulaion of sludge. Distribution of the influent over the tank area and the up-flow principle minimizes short-circuiting, and the smaller area of sludge collection makes for economy of installation. Clarification rates of 1.5 inches of rise per minute or [0.9 gpm./sq. ft. of plan area] are recommended.

Another design progressively slows the upward flow rate through a sludge blanket in a conical tank.[3, 4] Chemicals are fed to the raw water as it passes downwardly through a central mixing chamber, the interior and bottom of which are swept by horizontal, rotating agitators. The partially treated water then turns upward through an annular, funnel-shaped clarification section, in which a suspended sludge blanket is maintained.



Section Through an Accelator Diagrammatically Sketched

Observe that the chemical dosage applied to the recirculating sludge slurry, rather than to the influent raw water centering at the maximum permissible distance removed from the point of chemical application. This constitutes the genuinely novel feature of the process aided by voluminous sludge recirculation and up-flow subsidence.

The steps of chemical mixing and flocculation are carried out in one unit, followed by upward flow through the clarifying sludge blanket. The expanding cross sectional area creates a progressively slower rising rate as water flows upward in the clarification zone, and affords opportunity for each floc particle to find its own level of maximum rise, according to its size and weight and the flow rate at that level. Sludge is removed from the bottom, either directly or into separate concentrators for further thickening.

Clarification rates of the same order of around 1.5 inches rise per

minute [1.0 maximum gallon per minute per sq. ft. of free net clarification rate] are understood, although published data on coagulation and clarification performance of this type unit is not available.

More recently, there has been brought out a design using a cylindrical tank, bringing influent water into the bottom through a rotating distributor which provides chemical mixing and agitation in a suspended sludge blanket at the lower portion of the tank. Clarification occurs as the water progresses upward through the sludge blanket, and a central concentrator is provided for thickening and discharge of sludge. [No clarification performance data is known to be published, but operating rates in the range of 1.0 to 1.1 gallons per minute per sq. ft. of tank area have been mentioned.

It will be noted that these devices all are similar in following one general principle of adding chemical to incoming water, and then going through the steps of mixing and flocculation and upward filtration through a sludge blanket. All provide improvement over operating results and space requirements of conventional, horizontal flow basins, the characteristic operating rate being in the neighborhood of 1 gallon per sq. ft. per minute. Separate flocculation zones are still present; and emphasis is placed on improved means of separating the solids, after such coagulation, by using sludge blankets of varying types.

The "Infilco" Accelator

The Infilco Accelator, in contrast to the units previously described, is a development which completely departs from the conventional step of mixing chemical with the raw water before it enters the clarifying unit. It uses no sludge blanket, and no preliminary flocculation of the influent water. It is based on early work by International Filter Co. in sludge return during the period from 1919 to 1927, on which basis sludge return patents were issued to Behrman and Green.[5] Although return of sludge from ordinary basins greatly hastened the completion of chemical and physical objectives, there had been only a limited utilization of sludge return. This was due largely to the difficulties of gathering sludge from the floor of conventional basins and returning it to the influent, without breaking up and losing its effectiveness in reclarification. Even in lime softening, wherein most of the sludge return work had been done, it was difficult to handle the return of sludge without appreciable loss of its benefits.

Realization That Operations Could Be Combined Simultaneously

In working out means of sludge return without pumping or destructive handling, development work through 1935 gradually led to the realization that the former steps of mixing, flocculation and clarification could all be replaced by one simultaneous operation. In this departure the essential element proved to be the controlled recirculation of large amounts of returned sludge slurry, the ratio proving to be 300 to 400 per cent of the influent water flow.

A Small Municipal Installation of the Accelator
Illustrative of the conversion of existing inadequate reaction and subsidence basins into units of far greater capacity than the filtration capacity permits utilizaiton of. It is not uncommon to realize chemical savings of better than 55 *per cent which can be credited to the accelator.*

By precharging the returning slurry in such large amounts with chemicals *before* diffusing it through the raw water, a remarkable difference in reaction is attained.

Samples dipped from such a slurry zone show completion of physical and chemical reactions in five minutes. At least 30 to 40 minutes are commonly needed for comparable results with any modification of conventional mixing, flocculation and clarifying steps. Release of extremely clear water from the slurry zone is obtained almost immediately, a sharp line of demarcation being characteristic even when the slurry zone is in motion or agitation within the limits of viscous flow.

As a consequence, clear water release at rates up to 2 and 3 gallons per minute per sq. ft. may be commercially practiced and *design is accordingly based on clear water release area*, rather than any consideration of holding time or detention. In color removal, coagulation of turbidity, and lime softening, the "Accelator" utilizes the same principles of sludge recirculation, simultaneous precharging of chemical, and almost instantaneous clarification. The slurry zone, even under its conditions of forced agitation, functions as a distinct medium, maintaining its own characteristic surface and specific gravity. It even effects at the clear water-slurry zone interface, an apparent surface tension of its own under viscous flow.

The exact physical chemistry of the Accelator slurry zone and its reaction is being given extensive study; the fundamental factors involved exert a complex, combined effect, which apparently warrants many channels of investigation. The effect, however, is subject to direct and ready application on various waters, and the design and principles of Accelator construction lend themselves to ready standardization.

Construction

The Accelator slurry zone occupies the entire lower and central area of the Accelator tank or basin, which is generally of simple cylindrical shape. Construction is entirely adaptable to square or other symmetrical shape. What follows will be more readily comprehended if the accompanying diagrammatic sketch of a cross section through an Accelator is examined.

Propellers on a central, single shaft, designed for positive, forced

circulation, recirculate slurry from the bottom, up though a central draft tube, then down over a hood which forms the roof of the lower recirculation zone. The area above the hood provides for clear water release and the slurry returns down around the periphery of the hood into the recirculation zone. Internal concentrators for sludge thickening are usually provided, discharging sludge either continuously or intermittently by either manual or automatic control, as desired. Clarified water is removed by a peripheral launder, troughs or other takeoffs at the surface.

The Accelator has no sludge blanket, nor any quiescent sludge or water columns in delicate hydraulic balance. The rate of recirculation is sufficiently high to effect complete and uniform distribution. The release of clear water, as has been mentioned, takes place from the slurry while it is flowing, velocities of 6 to 8 ft. per minute often being observable in the slurry surface. Due to the unique action of the slurry zone, Accelator floc is of greater than ordinary strength and toughness.

Positive Recirculation

Some of the best evidences of the noticeably distinct nature of Accelator action are the relatively high recirculation velocities attained without injury to the unique Accelator floc. Propeller peripheral speeds of 6 to 8 feet per second, and slurry velocities of 3 feet per second or more are successfully maintained. By contrast, established practice with ordinary alum floc dictates a velocity of about 2 feet per second peripheral speed, and water velocities of only 1 or 1.5 feet per second.

With such positive agitation, the short-circuiting or possible upset such as can occur with sludge blankets, are obviously a negligible factor in Accelators. Furthermore, higher concentrations of solids and overall specific gravities can be maintained in the slurry zone. This not only affords the greatest contact between water and slurry particles (an important element in the success of Accelator clarification) but permits correspondingly higher concentrations of solids in the thickened sludge discharge from the concentrators.

Likewise, a greater ability to accept sudden increases in influent suspended matter content is realized. And, this is very important with water supplies which may be subject to sharp increases in turbidity or suspended matter. Since there is complete recirculation without any dead areas where sludge might settle and accumulate, there is no problem of sludge decomposition or odor.

A Typical Installation

Of over 100 Accelators installed, for both clarification and softening, there are thirteen on clarification alone at this writing. Six of these are municipal installations, the remaining seven being industrial. One of the largest installations is a 12 million gallon per day Accelator Clarifier and filter plant at the Scott Paper Company, Chester, Pa.—a brief description of which may be pertinent.

The Chester installation (see cut) comprises two Accelator Clarifier units, installed in concrete basins 54 feet in diameter by 18 feet center depth, each having a rated capacity of 6,000,000 gallons per 24 hours; the necessary chemical feed and proportioning equipment for applying coagulant (aluminum sulphate) to the water; and eight concrete gravity Infilco filters with their attendant control equipment, each filter having a capactiy of 1.5 million gallons per 24 hours.

Saving of 83% in Area

The Accelators and filters are installed on a plot of land approximately 108 feet in width and 120 feet in length—a little less than 13,000 square feet or about 0.3 acre. The saving in space made possible by the Accelators not only created a remarkable economy but virtually saved the day for an improved water plant since the room required for a conventional system was not to be found. Such a conventional plant would have required 0.77 acre—or over 2½ times the area for the full plant.

If comparisons are made exclusively on the relative areas of the clarification basins alone, savings are even more startling. A conventional four-hour basin would have an area of about 27,000 square feet, whereas the two Accelators with a combined area of only 4,600 square feet is just 17 per cent of the former. One can readily understand the advantageous 83 per cent saving in space and extent of concrete work avoided.

The Delaware River at Chester contains appreciable industrial wastes and is used as a ship canal. It is subject to wide and extremely rapid variations in turbidity and organic content. Turbidities range from 50 to 500 parts per million, and may increase several hundred parts per million within a matter of a few minutes, when a ship of deep draft passes close to the intake. The turbidity of the water leaving the Accelator Clarifiers, before filtration, is consistently less than 5 parts per million—equal in clarity to many a so-called "clear" supply. Filtered, the water is brilliant and practically colorless. The active slurry zone of the Accelator provides an excellent shock absorber for the sudden increases in turbidity, which would upset results from ordinary installations.

Operating Economies Realized

From available data on the amount of coagulant used in the conventional plant which the Accelator installation replaced, it was calculated that the average alum dosage was at least 2.5 grains per gallon (357 pounds per million gallons). The Accelator operation uses only 1.5 to 1.9 grains per gallon (214 to 272 pounds per million gallons) of aluminum sulphate on this highly contaminated, turbid water. These low dosages of coagulant demonstrate the efficiency in chemical utilization of the Accelator. The excellence of clarification is shown by filter runs averaging 70 to 80 hours, the filters being washed for approximately 5 minutes at 15 gallons per square foot per minute rate.

Each Accelator is normally rated at 6 million gallons per day, or a rising rate of 1.83 gallons per square foot per minute. Operation is carried out at anywhere between this rate and 8.6 million gallons per day, or 2.62 gallons per minute per square foot—without loss of clarity or operating efficiency.

The chemical economy of the Accelator is well illustrated by the Chester installation. Similar reductions in coagulant dosages are found in other cases, as compared to previous conventional installations. Municipal installations of Accelators at Fairfield, Iowa, and Madison, Tenn., show coagulant reductions of 57 and 65 per cent, respectively. Savings of this extent may not always be realized, of course, but an expectation of using at least 25 per cent less coagulant seems conservative.

These savings are due not only to the greater effectiveness of the slurry zone coagulation, but also to the fact that the chemicals and slurry are circulated and recirculated many times through the raw water flow. Obviously, all chemical particles are utilized, and none become occluded in sludge only to settle out and become useless.

To summarize: the Accelator provides unique means of:

(1) Providing clarification at rates up to 2 and 3 gallons per square foot per minute of tank area.
(2) Delivering effluents, averaging well under 5 p.p.m. turbidity.
(3) Realizing chemical economies up to 25 per cent or more.
(4) Utilizing least space, saving up to 84 per cent plan area.
(5) Utilizing controlled sludge recirculation for:
  (a) Prevention of short-circuiting;
  (b) Elimination of sludge blanket;
  (c) Avoiding sludge stagnation;
  (d) Minimum sludge blowoff at highest solids concentration;
  (e) Ability to handle sudden variations in load;
  (f) Maximum flexibility and ease of operation.

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(4) Jensen, J. A., Jour. A.W.W.A., Sept., 1938.
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J. V. N. Dorr Receives Perkin Medal for 1941

Dr. J. V. N. Dorr

● The Perkin Medal, highest award in the chemical profession, was awarded January 10th to Dr. John Van Nostrand Dorr, president of The Dorr Company, Inc., New York, by the unanimous vote of a committee representing the five leading chemistry and chemical engineering societies. This award, established in 1906 in honor of the late Sir William H. Perkin, is awarded annually by the Society of the Chemical Industry for outstanding achievements in the application of chemistry to industry.

The list of former Perkin Medalists to which Dr. Dorr's name is now added includes such leaders in applied chemistry as Langmuir of General Electric; Stine of Du Pont; Landis and Whitaker of Cyanamid; Dow, the elder, of Dow Chemical; Oenslager of Goodrich; Tone of Carborundum and others. The medalist is chosen by representatives from the American Chemical Society, the American Institute of Chemical Engineers, the American Electro-Chemical Society, the Society of the Chemical Industry, and the Societe de Chemie Industrielle.

Dr. Dorr's address, "The Engineer and His Responsibilities to the World of Today and Tomorrow," took the form of a broad and far-seeing philosophical discussion of the role of the engineer —his responsibility to his profession, his country, and the cause of humanity. Human engineering was its central theme and the hope was advanced that engineers, who have been so successful in utilizing our material resources for human good, would utilize the same engineering type of approach to solve the broader problems of civilization, world politics, and the causes that lead to national unrest and war.

Two hundred and ninety-four attended a reception and dinner prior to the medal presentation, and more than five hundred attended the presentation exercises at the Chemists' Club in New York City.

W. W. DeBerard Appointed City Engineer of Chicago

"Deb"

W. W. De Berard, who for 31 years has been Western Editor of *Engineering News-Record*, resigned on February 3rd, to become City Engineer of Chicago.

Mr. De Berard ("Deb" to his many friends), was born in Fairfax, Iowa, was graduated by the Massachusetts Institute of Technology in 1901. His first job was that of bacteriologist and chemist for the Denver Union Water Co. where he built the pioneer laboratory for water analysis in the West. Later he conducted filtration experiments in Philadelphia, Pa., and Oakland, Calif.; was connected with James Fuertes in the design and construction of the filter plant at Harrisburg, Pa.; and later was employed on the design of the water and sewage treatment plants of Columbus, Ohio.

In 1910 he joined the editorial staff of *Engineering News-Record*, being assigned to the Chicago office, and has continued this connection these 31 years since. He was given leave of absence to serve as consultant to the Chicago Regional Plan Association, and also served on the Board of Review for the Chicago Sanitary District in the lake lowering controversy.

"Deb" has become well known for his active interest and participation in the affairs of a number of engineering societies and professional associations. He has just completed a term as a member of the Board of Direction of the American Society of Civil Engineers, and, only last month was elected Treasurer of the newly created Sewage Works Federation. He is succeeded as Western Editor of *Engineering News-Record* by H. W. Richardson.

In announcing Mr. De Berard's appointment, Oscar Hewitt, Director of Public Works, stated that Loran D. Gayton, will be Principal Assistant City Engineer.

M. Collier Appointed Supt. of Distribution at Atlanta

Mr. Collier

Meredith Collier, veteran Atlanta Water Works employee, was appointed Superintendent of Construction and Distribution to fill the vanacy incurred at the death of Mr. W. M. Rapp, Sr. This is a Civil Service appointment.

Mr. Collier entered the employ of the Atlanta Water Works March 10, 1896. He has filled a number of positions in the department including machine shop mechanic, blacksmith and foreman of pipe line construction. He has been actively engaged as assistant to Mr. W. M. Rapp, Sr., for more than twenty-five years.

Besides an indomitable faculty for hard work, he has two major hobbies. He is an amateur photographer of repute, having photographed a large number of the major improvements of the department during the past forty years. These pictures are one of the most valuable collections of their kind in the field of water supply. In more recent years, he has become an enthusiastic radio fan and has built a number of short wave-domestic sets which are the envy of his many evening visitors.

Mr. W. Z. Smith, General Manager of the Atlanta Water Works, in commenting on Mr. Collier's appointment, praised his many years of loyal and efficient service to the department.

A PROBLEM IN WATER METER REPAIRING —AND A SOLUTION

Some Results from the Use of Simple Metal Inserts in Badly Worn Thrust-Roller Slots

By C. M. McCord
Director, Division of Water,
MEMPHIS, TENNESSEE

THE purpose of this paper is to show the performance of certain water meters of the 5/8 inch size that have been in service, and due to this usage have developed imperfect thrust roller slots. The accuracy of registration of these meters will be shown at various flows, and, in addition, test results will be given after a simple stainless steel thrust roller guide or channel has been inserted in the slots of the measuring chambers. This method of repairing or reclaiming deteriorated measuring chambers through such rehabilitation has been used by the Memphis Water Division for a year and a half, and approximately 3,000 meters have been repaired in this manner and placed in service. Photographic cuts reveal at a glance the condition of the thrust roller slots of the meters involved in the study resulting in this report.

Five of the meters reported on were old meters in good condition, with the exception that the measuring chambers were as shown, and nothing else was done to any meter between tests except to install the Memphis Slot Insert and a new thrust roller.

The Purpose of This Article

It is not the purpose of this article to discuss water meter repairing in general, but to direct attention to a means of restoring the thrust roller slot so that satisfactory performance may be secured without need for replacement of the costly measuring chamber. It has been practical all along to repair registers and gear trains, and, in fact, all parts except the thrust roller slot. The tests reported here are for the purpose of showing the performance of these old meters that have been run through the repair shop and each provided with a new standard thrust roller. Then, in comparison, to show how these same meters registered after the stainless steel insert was installed in addition to a new thrust roller.

The Author

Initially, I would like it understood that this is not a criticism of water meters. In fact, some time ago I wrote a pamphlet in an effort to convince water consumers that water meters merited their complete confidence. This pamphlet has had wide distribution since. I consider today's water meters outstanding mechanical devices, but nevertheless subject to the destructive agencies of wear, corrosion, and erosion. In what follows I propose to report on meters made by four different manufacturers, since the worn slot condition is common to all.

A 13-Year-Old Meter

In Figures 1, 2, and 3 is shown the condition of the thrust roller slot in a meter which we shall designate as No. 1.

This particular measuring chamber has been in service thirteen years. Fig. 1 shows the condition of the lower section of the measuring chamber, and Fig. 2 shows the same part, except that the stainless steel insert mentioned above is shown in position.

Fig. 3 shows the top of the measuring chamber.

This meter, without and with the insert, tested as follows:

Rate of Flow (gals. per min.)	Without Insert	With Insert
16	95.7	100
10	96.3	100.9
4	98.0	102
2	98.5	103
1	80.0	102
½	0.0	100.5
¼	0.0	94.6

(With insert this meter ran on 1/16th gallon flow.)

For the third test on this same meter, a No. 30 drill was used to drill a hole parallel to and adjacent to the thrust roller slot in the lower

Figs. 1, 2, 3—Revealing conditions of the Thrust-Roller Slot (top left—bottom right) of Meter No. 1, after 13 years of Service in Memphis.

(Fig. 2 shows the rehabilitating Memphis slot insert, an invention of the author, in position. This insert curves inward toward the reader. What it accomplishes in increasing registration and delicacy of movement is revealed in the author's tables of test data.)

Fig. 4—Slot of Chamber in Meter No. 2. *Although widened considerably by shop filing to true up the sides, the meter lost accuracy rapidly at flows of 1 g.p.m. and less. A slot insert added brought registration up at 1 g.p.m. from 86% to 98.5%; from zero at 0.5 g.p.m. to 94%.*

half of the chamber, for the purpose of exaggerating the condition of wear. This was equivalent to increasing the width of the thrust roller slot an eighth of an inch. The insert was put back in position, and on testing the meter, no change in its registration could be detected on flows of ¼ gallon per minute and up.

It should be pointed out that this meter, with a slot worn as pictured, and with the wear further exaggerated by mechanically increasing the width of the slot an eighth of an inch, would run on a half-pint of water per minute with the insert installed.

Meter No. 2 Also 13 Years Old

The condition of the thrust roller slot of Meter No. 2 is revealed in Fig. 4. This is a meter that had been in service for 13 years. On a previous occasion it had been taken out and repaired, and the thrust roller slot had been straightened up by filing. The slot had an original width of ¼ inch, but the wear that had come on it, together with the filing operation, had produced a slot 23/64 of an inch wide. On being tested without an insert, and with the usual new standard thrust roller, and thereafter with a Memphis insert, this meter registered as follows:

Rate of Flow (gals. per min.)	Without Insert	With Insert
16	98.25	98.6
10	98.5	99.4
4	98.75	100.4
2	97.0	100.5
1	86.0	98.5
½	0.0	94.0
¼	0.0	89.0

(With insert this meter ran on 1/16th gallon flow.)

It will be observed that although this thrust roller slot was almost an eighth of an inch too wide, the meter did a fair job of measuring. When an insert and new thrust roller were placed in this extra-wide measuring chamber slot, the meter did a first class job for an old meter and actually ran on 1/16 gal. per minute.

The condition of this slot, and the fact that the meter ran on ½ pint per minute is convincing evidence that it is *not necessary for the insert to fit closely to the side walls of the slot* in order for the meter to perform in a most satisfactory manner.

On the other hand, if one is seeking the highest possible registration on exceedingly low flows, such as a pint per minute and one-half pint per minute, the leakage by the insert *is* noticeable. From a practical standpoint, accuracies of 85 per cent or better at one quart per minute is good performance for an old meter, and this is easily accomplished by use of the insert and without any filling of the worn side walls and back walls of the chamber slot.

Meters No. 3 and No. 4

The condition of the thrust roller slot in Meter No. 3 (top and bottom) is shown in Fig. 5. This is a meter that has been in service for 10 years, and without the insert, but with the new standard thrust roller, and again with the stainless steel insert, it tested as follows:

Rate of Flow (gals. per min.)	Without Insert	With Insert
16	100.7	100
10	101.3	100.6
4	102	102.2
2	103	103
1	0.0	103
½	0.0	99.2
¼	0.0	93.0

(This meter also ran on 1/16 gallon flow.)

The condition of the thrust roller slot in Meter No. 4 (top and bottom) is shown in Fig. 6. This is a meter that has been in service for 11 years, and without an insert, but with a new standard thrust roller, and thereafter with an insert, it tested as follows:

Rate of Flow (gals. per min.)	Without Insert	With Insert
16	98.5	100.2
10	97.9	100.3
4	0.0	100.8
2	0.0	101.0
1	0.0	98.75
½	0.0	96.0
¼	0.0	90.0

(This meter ran on 1/16th gallon flow.)

A Really Old Measuring Chamber Tested

The condition of the thrust roller slot in Meter No. 5 is shown in Fig. 7. This measuring chamber is, we believe, 30 years old, and has given many years of service. Without the insert and with a standard new thrust roller, and

Fig. 5—Slot condition, Top and Bottom, of Meter No. 3—a Fast One. (*No registration at 1 g.p.m. was raised to 103% by the insert; at ¼ g.p.m. 93%.*)

thereafter with an insert, it tested as follows:

Rate of Flow (gals. per min.)	Without Insert	With Insert
16	96.7	100
10	97.3	101
4	99.0	102.5
2	99.5	103
1	97.0	101
½	91.5	99.2
¼	0.0	86.2

(And this meter ran on 1/16th gallon flow.)

For the next test, we placed five *new* meters on the stand and ran a series of tests from 2 gallons per minute down. These meters were tested as we received them, and below are the results, showing the average registration for the five meters without the inserts at rates of flow in gallons per minute as given:

Rate of Flow	2	1	½	¼	3/16	⅛	1/16	1/32
Average, 5 meters	99.50	99.10	98.61	97.56	97.00	95.36	90.05	71.35

These five meters were then equipped with our stainless steel inserts and all tests were made again. The results of these tests are:

Rate of Flow	2	1	½	¼	3/16	⅛	1/16	1/32
Average, 5 meters	99.58	99.32	98.70	97.77	97.16	96.16	90.40	82.26

It is not claimed that the use of the insert will produce strikingly advantageous results in new meters that have been painstakingly produced, and so long as the meter remains new we need have little concern in any event.

Why Inserts for New Meters?

The tests *do* indicate that exceptional registration can be had with the insert. A new meter is not new for long, and therein lies the advantage of installing inserts in meters originally. As usage of the meter begins, deterioration sets in and the inexpensive stainless steel part will outlast the bronze chamber that represents, relatively, a considerable investment. However, from my limited experience in very low flow testing, I am of the opinion that use of the insert will make for a more uniform behavior of meters at low flow rates, will produce registration at still lower flows, and will improve the accuracy of registration.

These tests indicate that if the insert be installed in a new meter, the meter would not drop out at, say, two quarts per minute some few years after installation, but would keep on performing just as when new. In other words, the use of this insert in a new meter would prevent ragged thrust roller slots from ever developing, and thus prevent loss of revenue. Should this two quarts per minute be leakage, and the rate is twenty cents per hundred cubic feet, this amounts to $7.00 per annum. Obviously, maintaining meters running and accurately registering consumption and waste is extremely important, and should this slot insert prove as enduring as one could logically expect, it offers great possibilities for increasing the useful life of meters.

All tests reported on were made jointly by Mr. Jerome Baker, assistant foreman of the meter shop of the Memphis Water Division, and by me. The equipment used consisted of a ten cubic foot tank with a gauge glass at the five cubic foot level, and arranged so that 1 per cent variation caused a 1-inch movement of water in the glass. This same arrangement is provided at the 10 cu. ft. level, and makes it practical to read easily one-tenth of one per cent. We also made use of a 1 cu. ft. calibrated tank. Large flows were obtained by calibrated needle valves, and small flows by the use of calibrated orifices in combination with a glass tube head indicator. The tests were made carefully and painstakingly, and reflect the actual conditions and performances of the meters in question.

In making this insert of stainless steel, we selected a material known to be tough, hard, and resistant to corrosion, and one that holds up in most waters. It is thoroughly possible, but not probable, that in a particular water some other material or alloy might prove to be more enduring. Should this be the case, the insert lends itself to being manufactured out of any ductile metal or alloy, and the experience that comes with usage can be taken advantage of in the fullest manner. However, it is our belief that by using this stainless steel part, expensive measuring chambers that have become defective at one point only can be kept in service almost indefinitely and made to perform with an amazing degree of accuracy through long periods of no repairs.

With one and a half years of experience with this insert, we believe it to be decidedly advantageous to install them in all repair jobs, and we are confident that its continued use will be reflected in revenue, and will reduce unaccounted-for water.

While the chief incentive to keep meters performing accurately is no doubt for the purpose of bringing in revenue, this is not the only advantage. All of you water works men have had severe complaints, and many of them, because the old meter slowed down. The customer, on receiving smaller and smaller bills naturally concluded that he was using less water. Finally, another meter is installed on his service, and when he gets a correct bill, the complaint clerk gets an irate customer that knows positively that the new meter is wrong!

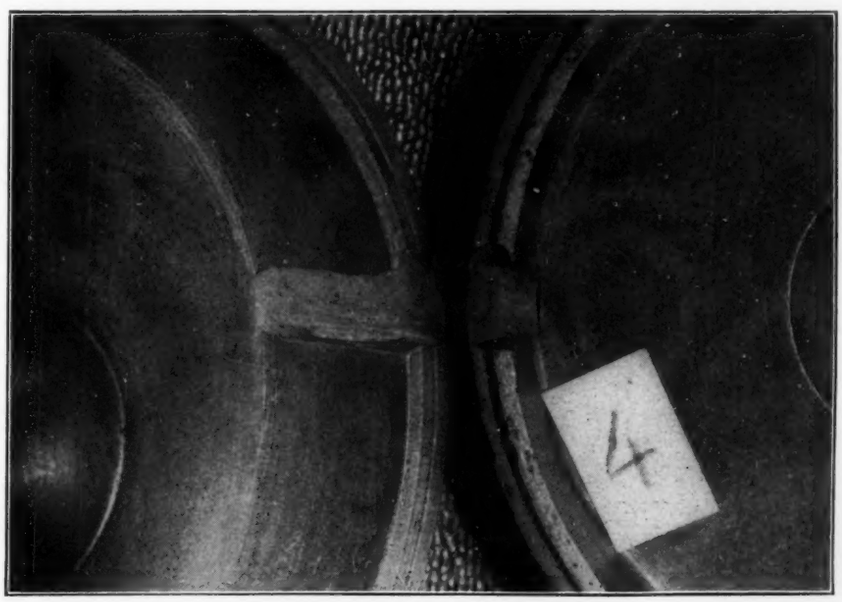


Fig. 6—Condition of Slot in Meter No. 4.
(Little wonder there was zero registration at 4 g.p.m. and under. With the insert the performance was 100.8% at 4 g.p.m.; 96% at 0.5 g.p.m. Actually ran on 1/16th g.p.m. flow.)

The use of this insert requires no drilling, sawing, or machine work of any kind, and no more skill than is required of a workman accustomed to doing a careful job of repair work. Any good meter mechanic can make the installation. The insert is sensitive to length. When the proper length is obtained, the two halves of the measuring chamber will fail to close at the point where the insert is installed by just a few thousandths of an inch. If the insert should hold the two halves of the chamber farther apart than this, it should be removed, and either filed or the end turned slightly inward, which has the effect of reducing its length.

Should the measuring chamber close completely with the insert in position, the insert should be removed and the projecting ends peened slightly to increase the length of the insert.

In making final closure of the measuring chamber halves, the section of the chamber immediately over the insert should be brought together last.

Fig. 7—Chamber of Meter No. 5—Probably 30 years old.
(At 0.5 g.p.m. the insert raised registration from 91.5% to 99.2%. Meter ran at 1/16th gal. flow.)

I realize fully that in presenting this paper for the attention of my co-workers in the water works field I have made statements of the performance of meters employing this insert that are difficult to believe. My own opinion of the usefulness of this device is indicated by the fact that I have filed patent papers and have encouraged a member of my family to invest money in an enterprise for the purpose of manufacturing and placing this article in the hands of meter repair men. To those who care to do some checking on their own account, inserts and thrust rollers will be furnished free of charge for experimental purposes.

[It is our understanding that a request addressed to the Meter Specialty Company, 1332 North Seventh Street, Memphis, attention Mollie McCord, Manager, will bring samples of inserts and thrust rollers to those desirous of testing them out. —Ed.]

A.S.C.E. AWARDS TO RAWN AND ELLMS

At the Annual Meeting of the American Society of Civil Engineers two members of the Division of Sanitary Engineering were singled out for their contributions of importance to engineering literature and recipients of two highly coveted awards of the Society.

A. M. Rawn

To A. M. Rawn, Chief Engineer and General Manager of the Sanitation Districts of Los Angeles County, went the James Laurie Prize established in honor of the first president of the Society. This prize was awarded Mr. Rawn and co-authors A. Perry Banta and Richard Pomeroy, Sanitary Engineer and Chief Chemist associated with the senior author for their joint paper, "Multiple-Stage Sewage Sludge Digestion." This paper (No. 2016 in the Transactions) constituted a description of the unique Los Angeles County sludge digestion scheme and the pronounced speed of digestion attained through the practice of allowing seeded sludge to gravitate through a stepped-down battery of four digestion tanks operated in series to provide multi-stage digestion.

Mr. Rawn has contributed numerous papers of value to the literature, is a past president of the California Section of A.S.C.E. and the California Sewage Works Association, and was elected a Director at Large by the recently formed Sewage Works Federation. For several years he has been Associate Editor of WATER WORKS AND SEWERAGE.

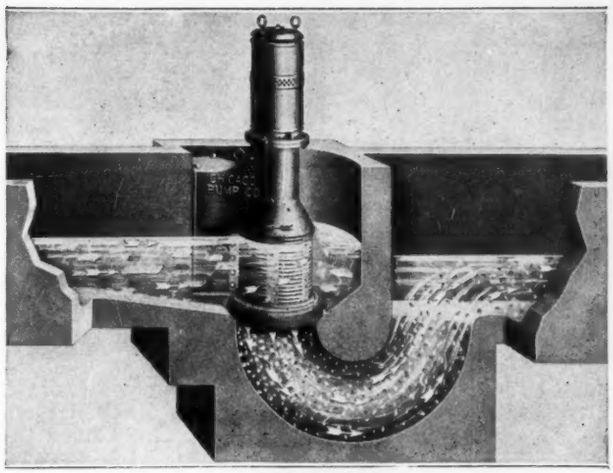
J. W. Ellms

To Joseph W. Ellms, Commissioner of Sewerage, Cleveland, Ohio, went the coveted Rudolf Hering Medal which was endowed by the Sanitary Engineering Division to memorialize a brilliant sanitary engineer whose name the medal commemorates. This medal which goes to the author of that paper adjudged to represent an outstandingly valuable contribution to the advancement of the sanitary engineering profession, has only infrequently been awarded. It was voted to Mr. Ellms for production of the "Manual on the Design and Functions of Water Treatment Plants." Although this manual was the product of a committee, Mr. Ellms was chosen to receive the medal for his work as chairman of the committee and compiler of the manual.

Mr. Ellms was also cited as a member deserving of the distinction because of the pioneering part he had taken in developing rapid-sand filtration with Fuller, Weston, Johnson and others at Louisville, Ky., in 1896 and at Cincinnati in 1898. In the audience was Robert Spurr Weston, whom Linn H. Enslow as chairman of the Awards Committee, called upon to stand and also be recognized for his part in the pioneering work at Louisville.

SPECIALIZED EQUIPMENT

For Automatic, Trouble-Free Handling of Sewage



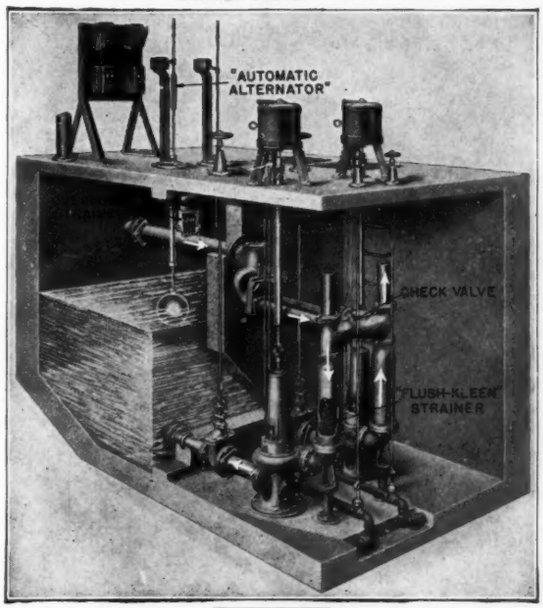
COMMINUTOR
Automatic Screening and Cutting of All Coarse Sewage Matter

• **COMMINUTOR** eliminates screening labor and nuisance by sub-surface, automatic screening and cutting of all coarse material in the sewage. No screenings to handle, no burial, no incineration.

The comminuted solids settle out in the primary tank and are disposed of with the primary sludge. Comminutor protects mechanical equipment against binding, pipes against clogging, and the operator against infection from handling screenings.

OVER 700 INSTALLED.

Complete dimensional layouts and sewer flow curves in Bulletin 185-A.



FLUSH-KLEEN
Rags and Other Coarse Solids Do Not Pass Through Impeller

• **FLUSH-KLEEN** Sewage lift station eliminates pump clogging and costly maintenance labor which is required for dismantling and cleaning ordinary sewage pumps.

Flush-Kleens are installed in duplex sets. While one pump is operating, sewage flows into the basin through the idle pump, as indicated by arrows. Coarse sewage matter is retained by the Flush-Kleen strainer in the idle pump — only water passes through impeller to wet basin. When the idle pump operates, the coarse sewage matter in the strainer chamber is flushed out through the discharge pipe with the water from the wet basin. The check valve prevents operating pump from discharging back through the inlet line. In the meantime, sewage flows into the wet basin through the idle pump. Automatic Alternator transfers operation from one pump to the other. Both pumps may operate during peak flow, at which time sewage inflow is through overflow strainer.

OVER 2,500 INSTALLED.

Complete Flush-Kleen engineering data and typical layouts in Bulletin 122-B.

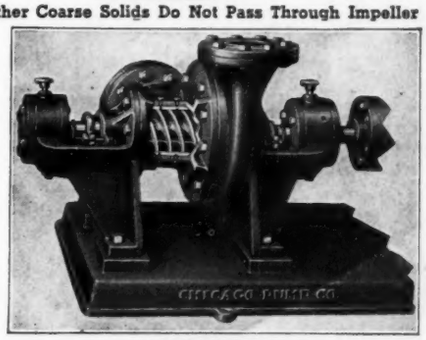
• **SCRU-PELLER** was designed especially for pumping primary sludge. Also effective in handling raw sewage with heavy solids.

The only cutting pump with ball bearings on both sides of the impeller and built STURDY enough to withstand sudden severe shocks.

It is a centrifugal pump with a cutting screw feed in the suction. Cutting edges on the screw and in its housing shear solids that clog ordinary pumps.

Nine cutting edges provide continuous multiple shearing actions all the way through the pump.

OVER 500 INSTALLED.



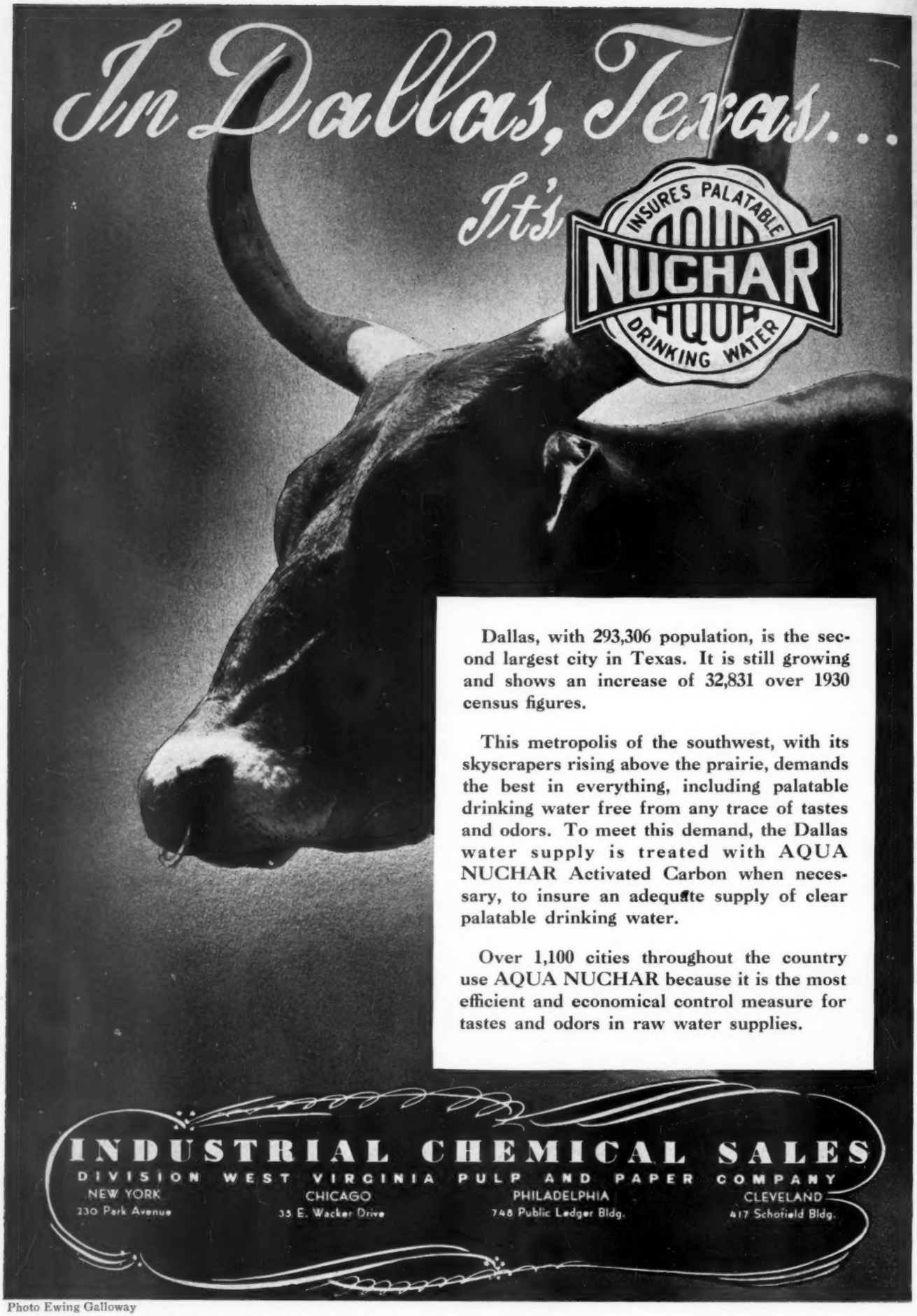
SCRU-PELLER
Centrifugal Pump With Cutting Screw Feed

CHICAGO PUMP CO. SEWAGE EQUIPMENT DIVISION

2336 Wolfram Street, CHICAGO, ILL.
Phone BRUnswick 4110

VACUUM—CONDENSATION—CIRCULATING—BILGE
FIRE — HOUSE — SEWAGE — SCRU-PELLER PUMPS
AERATORS — COMMINUTORS — SAMPLERS

REPRESENTATIVES THROUGHOUT THE UNITED STATES AND FOREIGN COUNTRIES



Dallas, with 293,306 population, is the second largest city in Texas. It is still growing and shows an increase of 32,831 over 1930 census figures.

This metropolis of the southwest, with its skyscrapers rising above the prairie, demands the best in everything, including palatable drinking water free from any trace of tastes and odors. To meet this demand, the Dallas water supply is treated with AQUA NUCHAR Activated Carbon when necessary, to insure an adequate supply of clear palatable drinking water.

Over 1,100 cities throughout the country use AQUA NUCHAR because it is the most efficient and economical control measure for tastes and odors in raw water supplies.

INDUSTRIAL CHEMICAL SALES

DIVISION WEST VIRGINIA PULP AND PAPER COMPANY

NEW YORK 230 Park Avenue
CHICAGO 35 E. Wacker Drive
PHILADELPHIA 748 Public Ledger Bldg.
CLEVELAND 417 Schofield Bldg.

Photo Ewing Galloway

Relaying part of 36,000 feet of 24- to 36-inch cast iron pipe salvaged, reconditioned and relocated by the City of Reading, Pa.

POCATELLO, IDAHO
salvaged and relocated a 10" cast iron water main after 43 years of service in the heart of the city.

ESCANABA, MICH.
After many years of service, Iron City, Mich. takes up an abandoned cast iron water main and sells it to Escanaba where it is relaid.

KENOSHA, WIS.
salvaged and relaid a 14" cast iron water main after 43 years of service in its original location.

HOPKINTON, MASS.
recently salvaged and relocated an 8" cast iron water line laid in 1884.

ELGIN, ILL.
salvaged and relaid a 52-year old cast iron water main. More than 98% was reclaimed — balance sold for scrap iron.

CLEVELAND, OHIO
salvaged and relocated a 42" cast iron water main after 46 years of continuous service.

SPRINGFIELD, MO.
salvaged and relocated part of a 50-year old cast iron water main and reinstalled it in another part of the city.

READING, PA. SALVAGES AND RECLAIMS 7 MILES OF CAST IRON PIPE

A striking example of the salvage value of cast iron pipe. Seven miles of 30- to 40-year old 24", 30" and 36" pipe were salvaged, reconditioned and relocated. Had this pipe been abandoned, the cost of new pipe would have been about $350,000. See photograph above. Cast Iron Pipe Research Assn., Thos. F. Wolfe, Research Eng., 1015 Peoples Gas Bldg., Chicago, Ill.

PHILADELPHIA, PA.
salvaged, reconditioned and sold to Glendale, California a 24-year old 48-inch cast iron water main removed for subway construction.

GLENDALE, CALIF.
installed salvaged 48-inch cast iron pipe bought at a saving from Philadelphia. After 13 years, Glendale salvaged this pipe and relaid it for the third time.

ATHENS, GA.
salvaged and re-used an 18-inch cast iron water main after nearly a half century of service.

EL PASO, TEXAS
salvaged a 6" cast iron water main, removed for a larger installation, and relaid it elsewhere in the city.

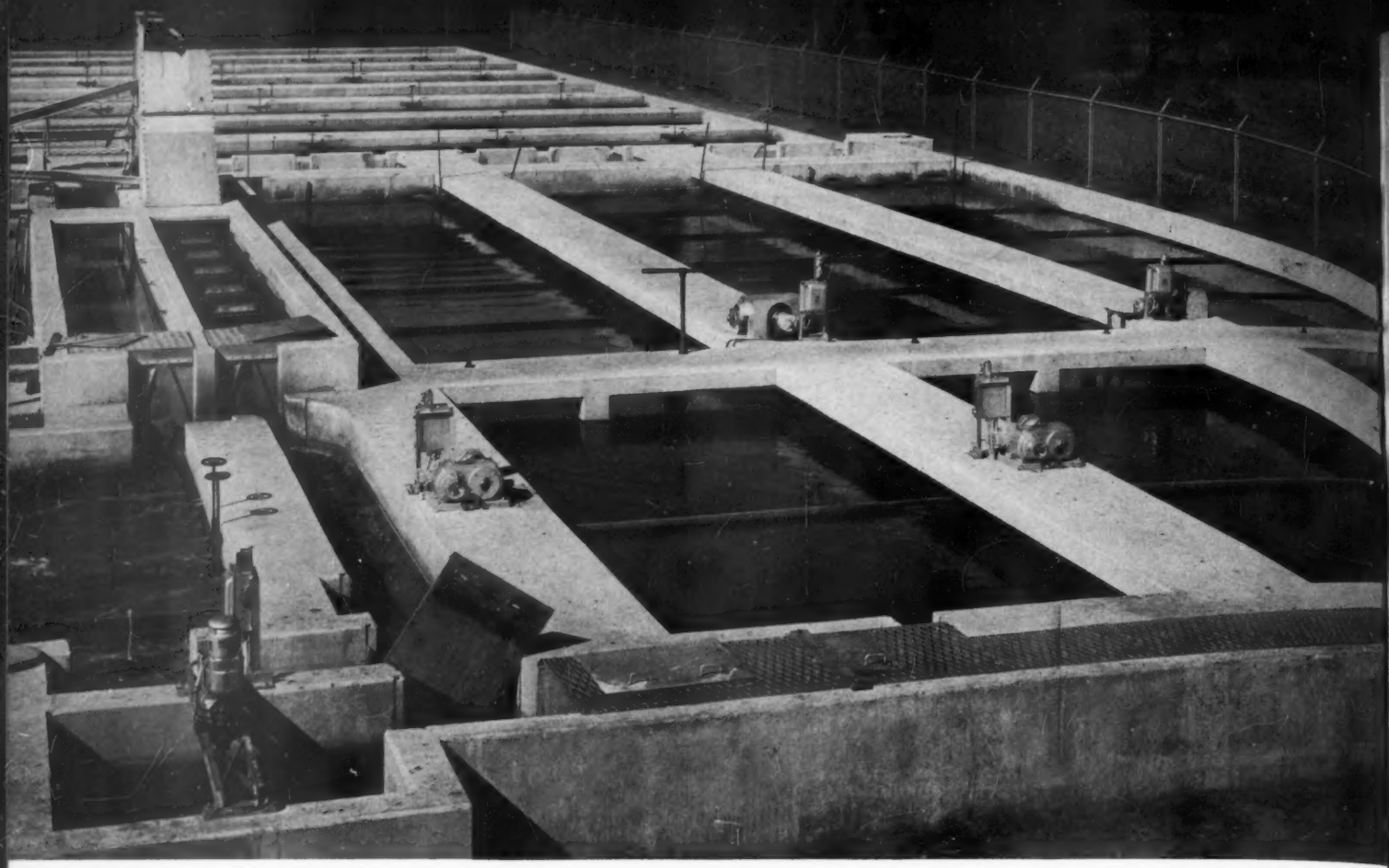
RICHMOND, VA.
salvaged and relocated a 10-inch cast iron water main after 88 years' service in its original location. This pipe is now 112 years old.

DALLAS, TEXAS
removed and cleaned for re-sale a large diameter cast iron water main after 25 years of trouble-free service.

ST. LOUIS, MO.
The St. Louis County Water Co. salvaged and relocated a 12-inch cast iron water main after 19 years' service, replacing the original line with 24-inch cast iron pipe.

SPRINGFIELD, ILL.
salvaged and relaid 5 miles of 24-inch cast iron pipe 21 years old, saving $100,000 over the cost of new pipe.

NASHVILLE, TENN.
salvaged a 24" cast iron main after 59 years' in a congested section of the city and put it back in service elsewhere.



LOW COST TREATMENT

EFFICIENT OPERATION — LITTLE UPKEEP
CAREFULLY DESIGNED — IMPROVED UNITS
YEARS OF EXPERIENCE — CAN OFFER TECHNICAL DATA
BOTH EQUIPMENT AND DESIGN
MODERN METHODS — LATEST IN MECHANIZATION

Low-cost operation and performance are by-words in this modern plant in which Jeffrey equipment has played an important part.

●

Jeffrey equipments for Sewage and Water Treatment plants:

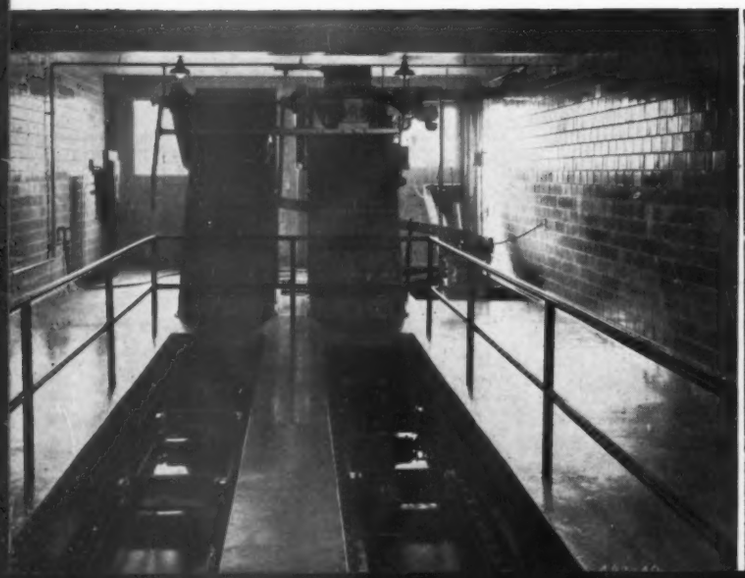
Sludge collectors for rectangular tank design
Self-cleaning bar screens
Scraper or V-bucket type grit collectors
Grit washers (jig type)
Scum removers
Sludge elevators
Floctrols
Screenings grinders
Dried sludge grinders
Chemical feeders

SANITARY ENGINEERING DIVISION

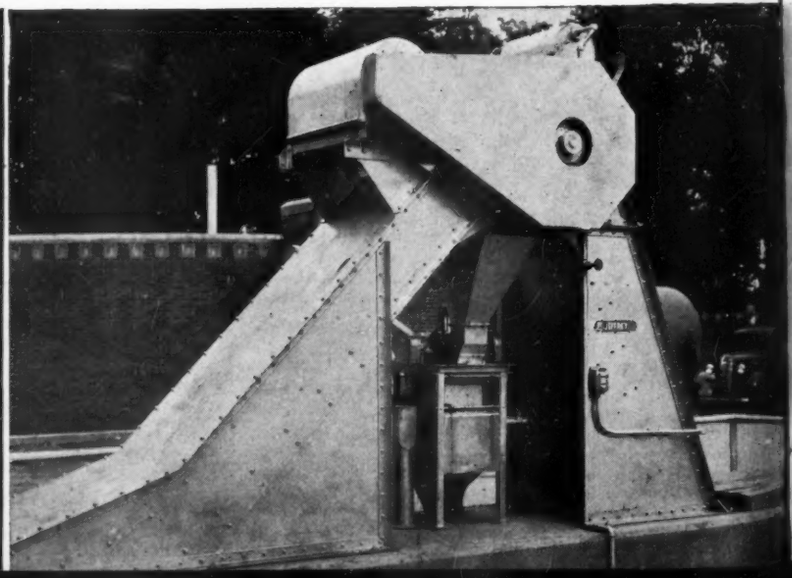
The Jeffrey Manufacturing Company

996-99 North Fourth Street, Columbus, Ohio

…w below shows a Jeffrey V-bucket grit collector discharging directly into a No. 1 JIGRIT. Organic overflow drops directly into channel.



Longitudinal view (below) through two Jeffrey V-bucket grit collectors. Grit is flumed to No. 1 JIGRIT shown at right of collector housing. This method is patented.



Louis R. Howson

A.W.W.A. BOARD ACTIONS

Louis R. Howson To Be Next President

Abel Wolman Vice-President

W. W. Hurlbut Voted the Diven Medal Paul Weir Awarded the Goodell Prize

Abel Wolman

J. Walter Ackerman, Frank C. Jordan and R. C. Harris, Made Honorary Members

ON JANUARY 13th Directors of the American Water Works Association assembled in New York City for the two-day Annual Meeting of the Board. This was the second of the two day annual sessions of the Board which this year, as last, proved needed to properly discuss and dispose of matters requiring the Board's consideration and action. It proved a busy two days of an excellently attended meeting, with 31 of the 34 Directors present.

Officers Chosen

The first order of business was the selection of nominees for the three principal offices, with the following results:

For President—
Louis R. Howson,
Consulting Engineer, Chicago, Ill.

For Vice President—
Abel Wolman,
Johns Hopkins University,
Baltimore, Md.

For Treasurer—
Wm. W. Brush, Editor,
New York City, N. Y.

These nominations are tantamount to elections and on March 1st become so automatically, unless others are nominated by the membership at large before such date. The new officers are not seated however until the close of the 1941 convention.

Awards Voted

To W. W. Hurlbut of Los Angeles was voted the highest award of the Association—the John M. Diven Medal, which goes "to that member performing some outstanding service to the Association." The citation reads:

W. W. Hurlbut (Diven Medallist)

To William W. Hurlbut of Los Angeles for his successful leadership of the Steel Pipe Committee to the completion of a series of specifications for steel pipe and protective coatings. He has in this enterprise rendered conspicuous service to the entire water supply field."

Mr. Hurlbut, a past-president of A.W.W.A., is Ass't Chief Engineer and General Manager of the Los Angeles Bureau of Water Supply. It is evident from this added honor that Mr. Hurlbut's active interest and work in the Association did not subside with the completion of his term as its highest officer in 1937. It has been the "wheel-horses" like "Bill" Hurlbut that have put A.W.W.A. where it is today, during a 5-year period of phenomenal growth in size, accomplishments and influence.

To Paul Weir of Atlanta, Ga., was voted the coveted Goodell Prize which goes to the author of the most meritorious paper printed in the A.W.W.A. Journal during the year. The citation reads:

Paul Weir (Goodell Prize Winner)

To Paul Weir of Atlanta, Ga., for his paper on "The Effect of Internal Pipe Lining on Water Quality," printed in the September, 1940, issue of the Journal. The author of this paper has made a notable contribution to water works knowledge. He has done well in planning his research, recording and analyzing his data, and stating his conclusions thereon."

Mr. Weir, who is Superintendent of Filtration at Atlanta, not alone deserves recognition for the splendid piece of investigational work and the eminently practical type of demonstration resulting in findings which were the basis of his prize winning paper; he has been a dynamic force in building up the flourishing Georgia Water and Sewage Works Association and its important Annual Short School. A leader in the Water Purification Division of the Association, he is the present energetic Chairman of that Division. Paul has always realized that there is a lot of room for young men at the top, and has gone a long way in that direction already. He is a great asset to the Association, to Atlanta, and to his adopted state of Georgia.

Honorary Members

The Board elected three worthy members to Honorary Membership for reasons cited in the case of each.

J. Walter Ackerman

Mr. J. Walter Ackerman, retired Chief Engineer of the water department of Utica, N. Y., a member of the Association since 1910; a Trustee in 1930; Director 1931-2. An active participant in the affairs of the New York Section as well as the general Association; one who has given excellent service to the communities in which he has been engaged.

R. C. Harris

Mr. R. C. Harris, Commissioner of Works at Toronto for twenty-eight years; a member of the A.W.W.A. since 1913; oldest living Past-Chairman of the Canadian Section, over which he has held a guiding hand throughout its existence.

Frank C. Jordan

Mr. Frank C. Jordan, for many years Secretary of the Indianapolis Water Company; a member of the Association since 1911; Trustee 1920-22; Vice-President 1924; President 1925; Fuller Awardee 1940; a leading spirit in the organization of the Indiana Section, Secretary of the group during its earlier years; one who has led in his community and in the nation in promotion of the efficiency of water departments in reducing losses from fire.

Other Board Actions of Interest

The following are among actions taken by the Board of Directors which possess general interest to members of A.W.W.A. and the water works profession at large.

Grounding Research Project Authorized

Amongst recommendations contained in the report of the Water Works Practice Committee was the following. Pointing out htat insufficient evidence of a concrete character had developed from the work and studies of the Joint Committee on Grounding of electric systems through water pipes to justify any sound conclusions regarding the practice and its effect on pipes, meters and water quality, it was recommended by the Committee on Water Works Practice, that the Association establish and finance from general funds a research project in New York University for the express purpose of studying the problems associated with the gounding of electrical circuits through water piping. The Board approved the project and authorized the expenditure.

Longevity of Water Works Equipment to Be Established

Since it appears from recent disclosures of Past-president Reeves Newson and others that appraised values of water supply mains, distribution piping, and other equipment of important and high value nature in water supply systems, have been erroneously under-appraised in valuation procedures which have become generally accepted through usage and precedent rather than being supported on adequate technical grounds, it seems important to have the question of useful life of water supply equipment re-studied and reported on. Based on a recommendation by the Water Works Practice Committee, the Board authorized the setting up of a new committee to conduct such studies and allocated the needed funds for conducting the required investigations on a nation-wide basis. This new Committee on Useful Life of Water Works Equipment and Structures will be established under the general Chairmanship of the president-elect of the Association, Louis R. Howson, Consulting Engineer, who because of his past experience seemed to be in effect drafted for the job.

(Seems remarkable how many things some folks can take on at one time, but Mr. Howson accepted this assignment in his customary stride and much should result from the investigations to establish values in water supply systems considerably beyond those prevalently accepted in evaluation processes or in financing of new or refinancing of existing systems. In this undertaking the Association, we believe, could hardly have found an undertaking in which to invest some of its current income more wisely.

Also, it seems good wisdom to finance and guide the approved studies of effects from present electrical grounding practice. This, in order to bring forward some sufficiently conclusive evidence to prove the good and the bad in this practice, which is much debated and condemned by many water works men. However, there is lacking real and sufficient evidence that current grounding practice should be discontinued for something of less safe or assured results in protecting the general public. It is hoped that the studies planned will yield results that will end the "more smoke than fire" type of debate which has been waged between some water supply and some electrical authorities.—Ed.)

Award Rulings Reviewed and Revised

The Committee on Special Awards made its report and recommendations resulting in certain changes being made in terms of two awards given annually by A.W.W.A.

The George W. Fuller Award

The needed change made in the terms of this award now makes it possible for this form of recognition and honor to be given to ANY INDIVIDUAL who is a member of the Association regardless of grade or type of membership so long as he is a member in good standing at the time of the award. Also, the base of the terms on which and for which the award may be made has been broadened to include evidence of ability in leadership or ANY noteworthy contribution towards the advancement of water works practice.

The terms as revised now read that a George W. Fuller Memorial Certificate of Award may be voted by each of the Sections annually.

"To any individual member of The American Water Works Association of any grade, in recognition of his leadership qualities and/or for his contribution towards the advancement of water works practice wtihin the particular Section nominating him for the award."

The Henshaw Cup Award

The complexity of terms previously applying in determining that Section most deserving of the Franklin Henshaw Cup for quality as well as size of the Section's Annual Meeting, were modified to make simpler the determination of the winner and avoid wearing out so many slip-sticks in arriving at each Section's standing for the year. The terms as modified are—

"That the Franklin Henshaw Cup shall be awarded at each annual Convention of the Association to that Section which has held the best attended meeting during the convention year just past. . . ." "The best attended meeting is defined as that meeting at which the largest percentage of the Section's members are present."

At present the terms for the award of the Nicholas S. Hill Cup are also undergoing study for needed revision, and will be reported by the Committee and acted on at the Toronto Convention in June.

Covering Conduct of Section Meetings

The Board brought to a close a discussion which has been before it now for sometime, with seemingly no sufficient unanimity of opinion regarding limitations which should be placed on the conduct of annual meetings of the many Sections so as to bring some degree of uniformity into the methods of financing such meetings, paying for entertainment, and particularly in putting a ceiling on the lavishness (and cost) of such; also, in setting a policy in regards to manufacturers' exhibits at sectional meetings and other questionable expenses to this group which overly lavish plans for some meetings have in the past thrown onto those who exhibit or in other ways are called upon to contribute.

After considerable discussion and debate the Board adopted the following statement for the guidance of the Sections. This statement is based on a rather careful analysis and consideration given the findings and recommendations of the Committee on Sectional Affairs. It is subject to revision as further facts are developed.

(1) *The registration fees at Section meetings shall provide funds sufficient to cover all entertainment. Association funds shall be used for clerical expense and membership promotion only.*

(2) *Registration fees at Section meetings may be uniform for all*

grades of members or may be upon a graduated basis designed to provide through recorded channels funds to cover the requirements of Section 1, *provided, that the maximum fee for such purposes shall not exceed* $10.00 *for any class of member.*

(3) *Representatives of manufacturers who are not Associate members of A.W.W.A. shall be charged a registration fee double that charged the representatives of manufacturers who are Associate members.*

(4) *The Water and Sewage Works Manufacturers Association shall establish its own rulings as to exhibiting at Section meetings, except that no firm or person shall be allowed to exhibit at any convention or Section meeting unless he be an Associate member of A.W.W.A.*

Dues of Members in Service to Be Waived

In connection with members who may be unable to continue payment of annual dues while engaged in the armed services of this Nation during the present emergency, the Board authorized the waiving of dues of such members without discontinuance of the Journal, as covered in the following policy adopted—

Any person who is a member of the Association and who, during the present defense emergency, enters military service, may upon written application to the Secretary, be carried on the membership rolls and receive all benefits therefrom, without the payment of dues. He shall keep the Secretary informed concerning his correct address. He shall also renew annually his application for dues suspension so long as he remains in service and so long as this policy remains in effect.*

(*Meaning Air, Land, or Sea.)

Because of a peculiar situation which developed in some Sections, causing members who have in recent years joined the Association to become in arrears in the matter of dues and dropped automatically, the following ruling was made by the Board in order to permit reinstatement of these members without undue strain on these individuals, who ordinarily would be required to face payment of back dues in full before reinstatement would be possible according to existing By-Laws. It was understood that this opportunity constituted a special ruling justified only on specific grounds, but shall apply to ANY member now in arrears rather than solely the group for which the ruling was specifically made.

Any person who has been a member of the Association, whose membership has lapsed prior to 1940 *because of non-payment of dues, may be reinstated as a member without the collection of arrears required by the By-Laws (Article II, Section* 5*) if he makes application for membership and accompanies the application with the amount required to cover one year's dues. This privilege is granted during* 1941, *up to the closing day of the Section meeting in the area where the applicant resides.*

The Association Continues to Grow

That the Association is continuing its healthy and rather phenomenal growth, the following figures revealing membership at the close of each of the past six (6) years attest:

Year	*Members*	*Gain*
1935	2,682	...
1936	2,724	42
1937	3,064	340
1938	3,359	295
1939	3,710	351
1940	3,957	247

(5 year net gain of 1,275 results in a membership of almost 150 per cent of that at the beginning of the 5 year period.)

Preparations for the Toronto Convention

Board members were assured by Secretary Jordan that nothing had transpired to alter their choice of Toronto as the place of the 1941 Convention. Plans were shaping up in normal fashion—in fact in unexpectedly rapid fashion insofar as room reservations at the Royal York Hotel were concerned. He also pointed out that there are several nearby hotels in Toronto of smaller size but supplying excellent accommodations at rates even more reasonable than those of the larger and newer Royal York. He felt it his duty to warn Board Members, and all members, in fact, that assured accommodations would necessitate early action in requesting reservations, because from present indications it appeared that a lot of A.W.W.A. members had approved of Toronto as the Convention City and would find that a dollar taken to Canada would buy a good deal more than the same dollar spent in the United States.

At the luncheon on the final day of the meeting, W. J. Orchard, General Chairman of Convention Management, told of plans developing to match, if not surpass, the great record making A.W.W.A. Convention of 1929 held in the same hotel so successfully. Judging from the attendance figures secretly listed by Board members throwing their guesses into the pool (the winner of which gets the $1.00 per Director put on the barrel-head with his attendance number slip)—the Toronto Convention June 22-26th will prove a great surprise to those fearing that war conditions would keep too many away.

From Dr. A. E. Berry, who is in charge of Local Arrangements, the Canadian Director, J. Clark Keith, and the President, Norman Howard, we learn that every detail is being looked after to avoid any difficulty of A.W.W.A. members entering Canada. And, in Toronto, even such matters as a currency exchange desk in the Royal York Hotel is being arranged for the convenience of those attending the convention. Special Canadian entertainment is being arranged and it looks as if "the show will go on" just as though there was no war.

At the close of the Directors' meeting all were invited to remain while the set-up of the Technical Program was reviewed by Chairman Enslow of the Publications and Program Committee. With the several helpful suggestions made by a number of those who remained, and members of the Program Committee also in attendance, a worthy and diversified program is now in the making. It will be published in a subsequent issue. President Howard promises real interesting disclosures concerning experiences with water and sewage services of England, as the result of bombing and, especially timely, those means developed and found most useful in remedying damages suffered by these two utilities; and, likewise, what has been learned concerning preparations which have proved of the greatest worth in the situation. Just one glimpse behind the curtains reveals that one full session of the Convention is to feature preparedness measures and emergency equipment, and methods of chief interest to water works and sewerage operators and managers.

SUPERCHLORINATION AND DECHLORINATION*

With Emphasis on Its Value as an Aid in Water Preparation for Filtration

By MARSDEN C. SMITH
Chief Engineer

and

HOWARD E. LORDLEY
Plant Superintendent
DEPARTMENT OF UTILITIES
RICHMOND, VA.

IT will soon become apparent that this article should really be captioned "Superchlorination and Dechlorination as Aids to Water Preparation for Filtration."

It is indeed strange that so many operators have failed to appreciate the vast increase in plant efficiency and the reduction in operating problems which result from a conscientious and thorough study of heavy raw-water chlorination as a process of aiding in plant maintenance and bettering operations. Could you have seen the condition of the Richmond filter beds with their mud balls and cracks of yester-year and compare today's clean sharp sand, having no attention except standard washing at 100 to 300 hour intervals, you could scarcely believe you were in the same plant. Even more striking is the improvement in the quality of the finished water.

The best chemical and mechanical treatments are not always easily determined; but, certain it is, that when found, you may be assured that your filters will become mere strainers and polishers performing an efficient and dependable service.

Some Definitions

Perhaps it is well to define at the outset several of the terms used in this article:

"Prechlorination"—is in this instance the application of chlorine before coagulation.

"Superchlorination"—is confined to "prechlorination" to an extent that a controllable method of reducing the residual ahead of the filters becomes desirable for best plant performance.

"Dechlorination"—is the addition of some chemical or treatment for the purpose of reducing the chlorine residual to a figure within a desired range of values.

"Break-Point Chlorination" — is using that amount of chlorine which satisfies the chlorine demand of the water. Some prefer to define "superchlorination" as chlorinating in excess of the "break-point."

The Benefits of Prechlorination

Without doubt, superchlorination is one of the most important chemical treatments in modern plant operation; however, we should realize that we are not considering a new subject, inasmuch as Howard has successfuly used superchlorination and dechlorination at Toronto for many years: "Break-point" chlorination, of which with full justification so much has recently been published, is really new only in name. One of the authors reported in 1936 (WATER WORKS AND SEWERAGE, July, 1936, and A.W.W.A. Journal of October, 1936) the striking reduction in taste and odors obtained when prechlorination doses were consistently kept above certain amounts. This we believe constituted an early use of the "break-point" principle in the control of superchlorination of raw water.

Prechlorination was first used at Richmond at Enslow's suggestion, with particular consideration being given its adaptation as an aid in coagulation. Organic matter in raw water always tends to inhibit coagulation. Any water having a high organic content is more than apt to be difficult to properly prepare for filtration. Chlorine in sufficient quantity strongly affects the composition of most such organic compounds, reducing or eliminating their coagulation-inhibiting characteristics. And so, inasmuch as most filter plants must use a raw water of some organic content, prechlorination may in general be expected to prove helpful in coagulation. *And whether or not we realize such to be the case, coagulation is the most important phase of rapid sand filtration.*

Because sterilization is the one MUST of any water purification operation, there is another, and possibly a more important, need for prechlorination. Health authorities have recently been much perplexed by unexplained outbreaks of enteritis and other gastric disturbances. Fairly or unfairly, this has cast suspicion upon the effectiveness of sterilization by chlorination as practiced in many water purification plants. Short time contact in limited quantities of chlorine concentration is certainly neither a reliable nor an unfailing germicide. On the other hand, even the most skeptical health official feels full confidence in the certainty of complete sterilization when there is a long retention of the treated water in a high chlorine concentration. Prechlorination constitutes a certain method of providing such a condition.

There are other real benefits to be derived from prechlorination, one of which is that prechlorination to the correct extent serves to completely satisfy the chlorine demand of the raw before filtration. With this attainment the residual in the water reaching the consumer may be much more exactly controlled. In addition, the complete satisfaction of the chlorine demand produces a more persistent chlorine residual in the distribution system; hence, it is a tremendous aid in reducing "dead-end" depreciation of water quality.

Still another benefit of adequate prechlorination is the prevention of decomposition of the sludge in the settling basins, so common in our warmer climates. It is expensive to empty and scour settling basins. *The reduction in the number of necessary cleanings of these basins at Richmond creates savings which approximate the entire extra cost of prechlorination.*

Problems Created by Prechlorination

Unfortunately new problems are often created by the effort to use large quantities of chlorine before filtration. An intolerable increase in taste and odors may result when suddenly increasing the quantity of chlorine used ahead of filters which have accumulated considerable impurities. Another problem is caused by the rapid dissipation of chlorine in water exposed to sunlight. If sufficient chlorine be added to the raw water to provide for this loss from sunlight on days of little or no sunshine, an excessive quantity of chlorine will reach the filters and complaints from consumers will likely follow. Yet, if smaller quantities be added and the chlorine demand of the water, aided by a

*A paper presented before the Virginia Section of A.W.W.A. and here reproduced by permission of the Association.

bright sun, leaves no trace of chlorine at the filters, the efficiency of sterilization is apt to suffer. Quite naturally investigators directed their attention to eliminating these problems. As the result of such studies the use of activated carbon and "break-point" chlorination have been developed to solve the problem of tastes produced by prechlorination, And now partial dechlorination is urged as a solution to the problem of the maintenance of a fixed chlorine residual when correct prechlorination is used. Therefore, since we must agree that prechlorination is almost essential and since so much has been written about activated carbon, we should proceed to describe "break-point" chlorination and dechlorination.

"Break-Point" Chlorination Applied

The splendid work on "break-point" chlorination which has recently been carried forward by many investigators supplies a means to reduce to a minimum the work required to determine the most efficient prechlorination treatment for any plant at any given time. Particular attention is called to the excellent bulletin, "A Laboratory Method for the Study of Superchlorination," issued by The Chlorine Institute. However, it should be noted that many waters exhibit no definite "break-point." In fact, it appears that waters devoid of ammonia or having even as much as 0.05 p.p.m. will rarely show a definite "point." The curves in Figures I and II are those characteristic for such a water. In Figure I the ammonia is almost negative, and there is no indication of a "point"; but the water in Figure II, with 0.02 p.p.m. ammonia, almost develops a true "point." However, raw waters which have no "break-point" may be successfully superchlorinated without regard to this optimum point. Instead, the amount of chlorine to be added to the raw water then becomes that found necessary to maintain at all times the desired minimum residual at the point of dechlorination. Such has been the experience and the practice at Richmond over a period of years.

The plant treating a raw water which exhibits a definite "break-point" is fortunate. One of the characteristics of the "break-point" is the remarkable reduction in taste and odor, as well as in the residual chlorine, when the "point" is reached. Thus, such water may be chlorinated to the "break-point" and yet require neither dechlorination nor further taste correction measures. For these supplies which are troubled with taste and odors and in which the use of activated carbon is not practical because filtration is not practiced, "break-point" chlorination may prove invaluable.

Before proceeding let us point out an interesting proof in Figure I of the correctness of a statement made by one of the authors (see A.W.W.A. Journal, August, 1938, Volume 30, No. 8). Since using dechlorination

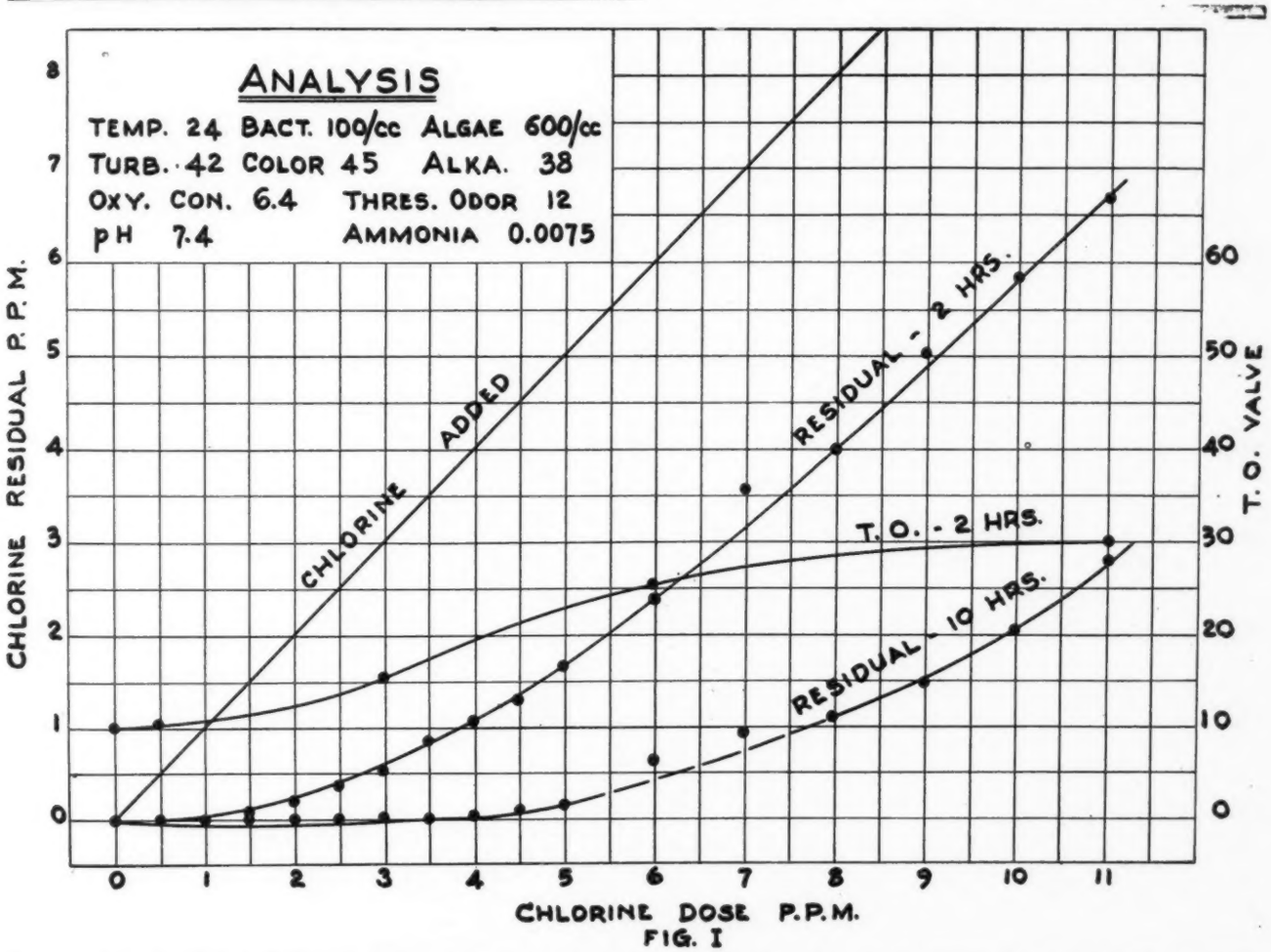


Fig. 1.—This "Break-Point" Curve, Without a Break, is Characteristic of Waters Practically Devoid of Socalled Free Ammonia.

(Note the increase in threshold odor value with increased chlorine dosage. However, no more activated carbon is required for the 30 T.O. value than for the original value of 10. To strike the optimum chlorine dosage of such waters, showing no defined "break-point," that minimum of residual chlorine which produces the lowest T.O. value after, dechlorination is maintained or somewhat exceeded at all times. Operating on this basis, dechlorination becomes the more important in avoiding the necessity of trimming the chlorine dosage to too narrow a margin for safety.)

at Richmond, the quantity of chlorine used has been increased. Figure I shows the tastes and odors of the raw water to have more than doubled, due to this increase in chlorine. In spite of this actual *increase* in taste in the chlorinated raw water, not one bit more carbon is required at the filter to give the same threshold odor in the finished water.

Dechlorinating Methods

There are available several effective dechlorination methods; of these, the most generally used in large plants is the sulfur dioxide method. For smaller plants sodium bi-sulfite may be preferred, and sodium thiosulphate and activated carbon should also be mentioned.

In theory, the following reactions occur when sulfur dioxide is used:

$$H_2O + SO_2 = H_2SO_3$$
$$H_2O + Cl_2 = HClO + HCl$$
$$HClO + H_2SO_3 = HCl + H_2SO_4$$

or

$$SO_2 + Cl_2 + 2H_2O = H_2SO_4 + 2HCl$$

Theoretically the quantities involved are 0.905 parts of sulfur dioxide for each part of chlorine to be reduced. As an example, if a residual of 1.2 p.p.m. chlorine is to be reduced to 0.2 p.p.m. then 0.905 p.p.m. sulfur dioxide will be theoretically required.

At Richmond, in winter, we dechlorinate approximately 0.2 p.p.m. of chlorine immediately before filtration. This quantity is selected because it is the minimum residual which is believed with certainty to insure effective sterilization. In summer, this is increased to approximately 0.4 p.p.m. to prevent growths of organisms in the filters.

Liquid sulfur dioxide is purchased in steel containers, similar to the one-ton chlorine containers, so that they may be handled with the same mechanical equipment that is used for chlorine. The amount of sulfur-dioxide used at any time is that required to produce the desired chlorine residual which, in turn, is determined by the orthotolidin test. Therefore, no control is needed save a pressure reducing valve to maintain a constant low pressure on a standard control needle valve. In addition a three-way cock is inserted in the line to preclude creation of a partial vacuum in the feed pipe when shutting down.

It may be interesting to state that the amount of chlorine used in the raw water at Richmond for July and August, 1939 and 1940, averaged approximately 38½ pounds per million gallons. Let us repeat that this is not a "break-point" chlorination but is instead a moderate superchlorination. The quantity of sulfur dioxide used varies through wide limits, depending, as it does, upon the ratio of the actual to maximum sunlight hours. As an example of this variation, one month in which an average of 42.28 lbs./mg. of chlorine was used for prechlorination, only 1 lb./mg. of sulfur dioxide was required for dechlorination; yet, the following month with only 35.2 lbs./mg. for prechlorination required 2.2 lbs./mg. sulfur dioxide for dechlorination. *But this very variation in sulfur dioxide requirement is the greatest single indication of its value in plant operation!*

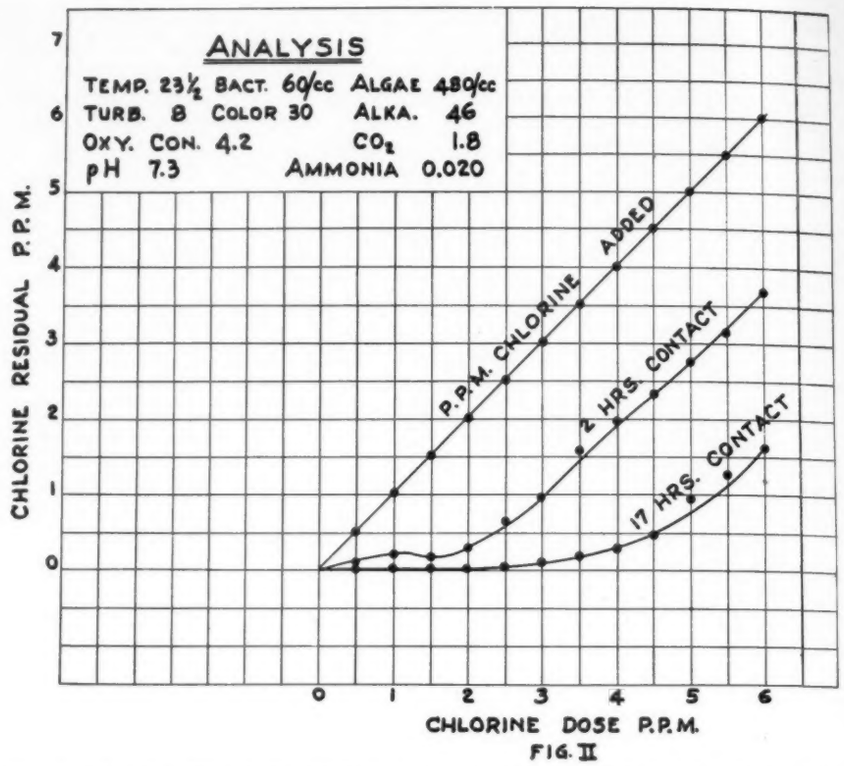


Fig. 2.—Another "Break-Point" Curve Characteristic of Waters Low in Organic Content and Socalled Free Ammonia.

(Note the dip at 1.5 p.p.m. is barely an indication that this water is susceptible to the effective "break-point" reactions. Treatment indicated for this water and that represented in Fig. 1 is the same—namely, an assured excess of residual and subsequent dechlorination.)

Conclusion:

In closing, even at the risk of being unorthodox, is it not in order to realize the tendency of the water purification profession to become super-faddist? Too often new ideas are hailed as panaceas for all that troubles us. We rush their adoption, later to realize that while we have found an improvement, we still have our problem. So let us not expect "Super" or "Break-Point" chlorination to prove more than another step forward in our progress to perfection. But surely, with such benefits as improved coagulation and sand beds, complete sterilization, exact control of chlorine residual, stabilized settling basins, and reduced tastes and odors, as likely rewards, every operator should at least investigate Super and Dechlorination as a measure of bettering plant operation and improving the product which he turns out.

WATER SUPPLY AND SEWERAGE REPRESENTED IN NATIONAL COMMITTEE ON DEFENSE

Wolman and Jordan Appointed by War Department

A committee of seven has recently been named by the Secretary of War for the purpose of studying and reporting on national defense problems with particular reference to public utilities, including water supply, sewerage, power and air raid shelters.

The committee chairman is Walter D. Binger, Commissioner of Works, New York City, who for several years was in charge of all sewerage construction for New York City. Members of the new defense study committee are Dr. Abel Wolman, Johns-Hopkins University; Harry E. Jordan, Executive Secretary A.W.W.A.; W. H. Carrier, A. B. Ray, Jos. L. Walsh and Scott Turner.

N. Y. S. S. W. A.

719 Members Strong at 13th Milestone of Progress

By HARRY A. FABER
Associate Editor*

THE New York State Sewage Works Association is still the largest group of its kind in the world. The spirit of its members, the activity of its various committees, and the energy of its several sectional groups explain in large measure why this should be so. A report of the secretary disclosed that during 1940 the membership has grown from 670 to 719.

At its Thirteenth Annual meeting in New York City on January 16th to 17th, over 300 members and guests were registered. It has become a regular feature to hold this winter meeting in conjunction with that of the Sanitary Engineering Division of the A. S. C. E. Technical sessions and an inspection trip to sewage treatment plants on Long Island were arranged to include members of both groups.

At the business meeting, officers were elected for the ensuing year:

President: Herbert H. Wagenhals, District Engineer, State Health Dept., Syracuse.

Vice-President: Robert C. Wheeler, Consulting Engineer, Albany.

Secretary-Treasurer (reappointed): Arthur S. Bedell, Chief, Bureau of Sewage, State Health Dept., Albany.

Assistant Treasurer: J. C. Brigham.

Assistant Secretary: A. W. Eustance (both of the State Dept. of Health).

To Serve on the Executive Committee (three year terms): Prof. W. L. Malcolm, Director, School of Civil Engineering, Cornell University, Ithaca; Charles R. Velzy, Works Supt., Buffalo Sewer Authority, Buffalo; Lawrence L. Luther, Commissioner of Sanitation, Freeport.

It was announced that formation of the Central New York State Section had been approved by action of the Executive Committee. This brings the number of local sections of the Association to five, including the Long Island section which was the first of its kind in the country and which, with its membership of 165, is still the largest.

A report described the four successful short schools held during 1940 to provide instruction for operators in connection with the State licensing laws. An evening preparatory course of eight sessions was a new undertaking of the Long Island section which proved so practical that it is already being duplicated by other local sections.

Presidents

(Retiring) *George Andersen, Supt. of Sewerage, Rockville Center, L. I.*

(Incoming) *Herbert Wagenhals, N. Y. State Dept. Health, Syracuse, N. Y.*

Kenneth Allen Memorial Award

Nine years ago the Kenneth Allen Memorial Award was established in honor of the first president of this association.* In line with rules revised in January, 1940, two awards are now possible each year: one for an outstanding paper pertaining to research or design, and one for a report on plant operation, or a paper by an operator, which evinces study outside normal routine. These papers must have been presented at an association meeting or published in Sewage Works Journal.

Secy. and Local Committee

Arthur S. Bedell, Ass'n Secretary (Elected Vice-Pres. of the New Sewage Works Federation)

William Raisch, Cons. Engr., N. Y. City and Wellington Donaldson, Director of Sewage Disposal, Dept. of Public Wks., N. Y. City (Members of Committee on Local Arrangements)

At the luncheon meeting, awards were made for both classes of papers by Charles C. Agar, committee chairman. For the most meritorious paper of technical and research nature during 1940, George E. Symons and William L. Torrey, Chief and Assistant Chemists, respectively, of the Buffalo Sewer Authority, were presented the handsome bronze placques. Their paper, "Buffalo River Stream Pollution Studies, 1936-1939," was published in the May, 1940, issue of Sewage Works Journal. Dr. Symons, in accepting the award, gave credit to the entire laboratory staff for development of data presented in the paper. He promised that endeavors would continue on many more research problems, backed by natural incentive without regard to honors in store or awards won.

A similar bronze plaque was presented to Nicholas Miljevic, former chief operator* of the Lackawanna plant, for that paper judged best of those covering studies of operation. This paper was, "Controlled Unloading and Its Effect on a Trickling Filter," as presented at the Western New York Section on April 4, 1940. [*When Lackawanna felt that it could not afford to pay a good operator what he was worth to others Mr. Miljevic went to work for a local steel mill.—Ed.]

Also during the luncheon session, C. George Andersen, the retiring president, was presented with a gold key bearing the emblem of the association. In addition to being an ornamental presiding officer George Andersen was cited as one of the Association's "Working Presidents." To prove that the Executive Committee believes in the "willing horse" axiom, the retiring president was appointed Coordinator of Local Sections, a newly created post for just such a worthy wheel-horse as is this Rockville "Centurian."

Federation Convention Plans

C. A. Emerson, President of the Federation of Sewage Works Associations, introduced W. H. Wisely of Illinois (until now Secretary of the Central States Association) who was only the day previous appointed to the new position of Secretary of the National Federation. He will operate a central office in Chicago, and will visit all of the various affiliated sections. Mr. Wisely was for several years Assistant Engineer of the Illinois State Dept. of Health before recently becoming Superintendent of the Urbana-

*Research Chemist, The Chlorine Institute, Inc., New York City.

Champaign (Ill.) Sanitary District and Treatment Works.

Plans for the next Federation Convention were outlined. These are for a meeting October 9 to 11 in New York City, to be held in conjunction with the Fall meeting of the New York Association. The following members of the Association were named as having been elected or appointed to important posts in the Federation: Arthur S. Bedell, Vice-Chairman; Linn H. Enslow, Director at Large; Lawrence L. Luther and L. H. Enslow to the General Policy Committee; Charles R. Velzy (Buffalo) and Prof. Rolf Eliassen (N. Y. University) to the Publications Committee.

Joint Banquet with A.S.C.E.

The usual joint banquet for members of the New York Association and of the Sanitary Engineering Division of the A. S. C. E. was attended by Frederick H. Fowler, the incoming president of A. S. C. E., who made a brief address.

The features of the evening were the highly interesting informal and off the record talks made by two engineers recently returned from the war zones. Robert H. Campbell of the Dorr Company and S. R. Williams of the Worthington Pump and Machinery Company related some of their first hand observations of what war really means. Mr. Campbell had represented his company for several years in Holland and Mr. Williams had managed the Worthington factory in Paris and offices in both France and Spain. Their experiences in the war zones of Europe during recent months were related in a matter-of-fact manner which held listeners spellbound.

Two other scheduled speakers, K. C. Stansmore (England) and A. C. Gronbeck (Italy) reported by radio from "somewhere on the Atlantic" that day and port of arrival had gotten a bit indefinite.

Award Winners

Dr. Geo. E. Symons
Chief Chemist
Buffalo Sewer Authority

Nicholas Miljevic
Former Chief Operator
Lackawanna, N. Y.

(To Dr. Symons and Associate Wm. L. Torrey, the coveted Kenneth Allen Award for the year's most outstanding paper of engineering or research nature; to Mr. Miljevic, the companion award for the best paper of the year dealing with plant maintenance or operation.)

Plant Inspection Trip

On Saturday morning following the meeting, something over 130 members were taken on a quick trip to four of the New York City sewage treatment plants located on Long Island. Through the new Midtown Tunnel the route led to the site of the Owls Head Plant, then to the Coney Island plant now being doubled in size; to the site of the 26th Ward Plant, to the Jamaica Plant, now nearing completion, and to the completed Tallmans Island Plant. Luncheon followed at the impressive new LaGuardia Airport and members were conducted on a tour of the Pan-American Airways hangar. There was much to see and much that time did not permit seeing.

The Spring Meeting of the New York Association will be held in Niagara Falls on June 19 to 21, so arranged to immediately preceed the National A. W. W. A. Convention in Toronto, which opens on June 22nd.

Technical Papers

"Achievements in Sewage Treatment in New York State During the Past Decade"—by Earl Devendorf, Assistant Director, Division of Sanitation, State Department of Health, Albany, N. Y.

Mr. Devendorf described the intensified program of stream pollution abatement which had its beginning in 1930. As a result of the progress made through Federal aid more people had been served by sewage treatment plants in the past 10 years than had been served in the preceding 30 years. Under PWA, a total of 111 sewage projects had been undertaken.

In New York City, the Coney Island plant, the Wards Island plant, and the Tallmans Island plant were constructed in that order. Over one-third of this city's sewage now receives treatment, but an estimated $154,000,000 more will be required to complete the gigantic program to clean up surrounding waters. Other large plants built in the state include those at Buffalo and Niagara Falls.

Progress under the TERA, during 1933-34, was largely to provide immediate utilization of relief labor. This included mostly sewer system projects, and only a few treatment plants. During 1936-40, under WPA, some 34 new plants were constructed, 27 were enlarged, and there were 123 sanitary sewer projects. These numbers merely

give some conception of the enormous program undertaken. The modern Ley Creek plant at Syracuse is one of the large plants built with WPA funds. Mr. Devendorf cited the commendable WPA requirement that sound engineering plans be submitted to the State Health Department for approval.

Chas. R. Velzy
Supt. Treatment Wks., Buffalo
(Chmn., Committee on Public Relations)

Prof. Gordon M. Fair
Harvard University
Cambridge
(Presented a paper of prize-winning caliber)

Of the combined programs, total construction resulted in 108 new sewage treatment plants and 54 enlarged plants. In the State over $113,000,000 ($59,000,000 representing Federal funds contributed) has been spent on sewerage projects. Indications are that WPA will continue during 1941 on a reduced scale because of some remaining unemployment.

"The Effects of Sewage Sludge Deposits on the Quality of Streams" —by Gordon M. Fair, Professor of Sanitary Engineering, Edward W. Moore and Harold A. Thomas, Associates, Harvard University, Cambridge, Mass.

Professor Fair commented that the title of this paper should properly be "Natural Purification of River Muds and Sediments" and that it is the forerunner of a series of related studies. Sewage sludge, he noted is either carried as a whole or is deposited in part in the receiving stream. About 60% of this sludge can be deposited in settling tanks or in streams, but this represents only about 30% of the decomposable matter in the sewage.

Nature's method of removing the pollution load is first by deposition. Then decomposition takes place through foraging activity of organisms. Particularly energetic action occurs nearest the point of entrance of pollution into the stream. Next follows a zone of lighter pollution and of different organisms; then, finally, the zone of lightest pollution and of organisms typical of pure water.

Two types of laboratory studies of progressive decomposition of under-water deposits of sludge may be made: First, the oxygen absorbed into decomposing sediment may be determined and, second, changes in the supernatant water itself may be measured. Apparatus has been designed to study both effects of decomposition, the latter measuring true *benthal* (bottom) oxidation. [Benthal oxidation may be described as a combination of aerobic oxidation at the sludge face or above and anaerobic decomposition beneath—Ed.]

Qualitative laboratory studies of

Past-Pres. Chas. C. Agar, Albany, N. Y. (Chairman of the Awards Committee)

Henry M. Rath, Supt. Tallmans Island Plant, New York (His plant a show place as well as a laboratory)

Henry Liebmann, Design Engineer Dept. of Public Works, N. Y. City (His "pets," the numerous gas engines in N. Y. plants)

sludge decomposition illustrate three periods, best described as: (1) "Youth," during which intensive fermentation occurs; (2) "Manhood," a period of gradual consolidation which may control the rate of transport of oxidizable materials to the sludge-water interface; (3) "Old Age," which is the quiescent stage and the period of stabilization.

Quantitative laboratory studies showed certain river sludges of indefinite ages to exert only four-tenths (0.4) of one percent of their initial oxygen demand as a maximum per day as decomposition proceeded, and thus to require over three years to completely decompose.

Joseph E. Rehler, Supt. of Water and Sewerage, Olean, N. Y.

George J. Schroepfer, Chief Engineer & Supt. Minneapolis-St. Paul Sewerage Commission, St. Paul

Ralph J. Sweeney, District Engr. N. Y. State Dept. of Health, Albany

Studies were then started with sludges consisting of fresh sewage solids. The 90 percent decomposition time was shown to proceed at the rate of approximately six-tenths (0.6) percent per day as a maximum. Each gram of oxygen demand per square meter of surface of deposited sludge may be translated into a requirement of nine (9) pounds per acre per day from the overlying water. The maximum ultimate demand is 720 grams of oxygen per square meter. General agreement was found in these studies with earlier work by Baity, Rudolfs, and Mohlman and Prof. Fair especially commended the pioneering work of Dr. Baity some 15 years ago.

It has been made apparent that Benthal oxidation actually proceeds by utilizing first the readily decomposable materials and leaving the less digestible substances to the last. Instead of expressing the rate by the old method of a unimolecular reaction, the rate of decomposition must include a retardation factor. In consequence a new mathematical conception has resulted and new equations have been developed by Professor Fair and coworkers at Harvard Univ.

(1) This "squad," active on the ferric-chloride firing line, represent Innis, Speiden & Co. From left to right: Paul Hiller, H. S. Cottrell, P. L. Frost, and "Top-Sergeant" H. G. MacKelcan. (2) The "Three Musketeers" from the Nyacks—all Chief Operators—G. C. Ward, South Nyack; Geo. Van Wyck, Nyack; Newton De Groat, West Nyack. (3) This pair of LaGuardia's "huskies" cleared the way through traffic for Chief Engineer Dick Gould and the trailing caravan of cars. To make scenery the cameraman put our host in "the grasp of the law" long enough to get this interesting snapshot. (4) Chicago Pump's "Stan" Kappe, Sidney Steiner and Milton Speigel, of Philadelphia, New York and Chicago respectively. (5) Prof. Earle Waterman, University of Iowa (Retiring Chairman, San. Eng. Div. of A. S. C. E.), Sam. Zack, Engr., Filtration Equipment Corp., and "Al" Goodman, Supt. of the world's largest treatment works—Chicago's southwest plant.

(1) Chain Belt's A. C. Lind (New York) and H. "Bart" Marshall (Milwaukee); (2) Seth G. Hess, Interstate Sanitation Commission, N. Y. City, and Prof. H. G. Baity, Dean of Engineering, Univ. of North Carolina; (3) M. W. Tatlock, Supt. Treatment Works, Dayton, Ohio, and Stewart Royer, Cons. Engr. of Richmond, Va.; (4) A. P. Loriot, with Malcolm Pirnie, Cons. Engr., New York, and Wm. D. Denise, Supt. of Sewerage, Greece, N. Y.; (5) Clarence MacCallum, Cons. Engr. and County Engr., Port Washington, L. I., and "Bill" Sowdon, Simplex Valve and Meter Co., N. Y. C.

Benthal oxidation of sludge varies between the limits of high rate aerobic and low-rate anaerobic decomposition. The rate determined by these studies is shown to be about 6 to 7 per cent per day, or to require about 4 kilograms of oxygen per square meter per day. The data presented applies to oxidizable material deposited only once.

Isador Mendelsohn, Sanitary Corps, U. S. Army, Washington
L. S. R. Hopkins, President, Bacterial Sewage Purification Co., N. Y. C.
A. P. Loriot, Consulting Engr.
Malcolm Pirnie, Engr., New York

No comprehensive review of Professor Fair's scholarly paper is possible until it becomes available in Sewage Works Journal.

In summarizing Professor Fair commented on the factor of sludge depth as well as temperature in determining oxidation rates, also the marked speeding up of rates accompanying gassification and sludge eructation into the waters above. Aerobic processes make the greatest demands per unit weight of decomposable matter, while the anaerobic processes akin to digesting sludge make the least. The markedly varying rates of benthol stabilization comes from the balance existing between the two processes at any given time or under varying conditions of temperature (bio-activity), sludge depth and sludge disturbance or rising into the overlying waters. The aerobic rate approaches the oxygen depletion rate (20% of the ultimate oxygen demand exerted in first 24 hrs.) observed for B.O.D. in polluted waters. The lowest anaerobic rate lies well below the rate of digestion of unseeded sewage solids, and well below 1% of the ultimate oxygen demand is observed during the first 24 hours. As to depth effects the initial rate to the ultimate demand varies as the square root of the depth. The rate is normally halved at the end of each 3 month period—such retarding factor having been recognized in the proposed modified equations and new curves which proved to fit observed relationships.

Great interest in the practical application of the factors and formulae developed in the Harvard studies was in evidence, and there was dissatisfaction over the curtailment of discussion because of the heavy afternoon schedule.

Dr. Rudolfs mentioned studies of sludges deposited over many years in the Connecticut River, and asked —since Prof. Fair gave data only to 90 per cent decomposition of sludge—if the rate changed when sludge was more than 90 per cent decomposed. It was explained that after 400 to 500 days the B.O.D. remains practically constant, and this degree of decomposition was selected to permit reasonable figures.

Dr. Mohlman noted the application of such studies to conditions such as those obtaining at Chicago. Studies started there in 1933 and continued for eleven hundred days indicated that the B.O.D. in milligrams per gram of sludge can be used to disclose the age of the sludge. Sludges show an active oxygen demand in summer temperatures and a quiescent demand in winter. He asked if the data given applied to all depths of sludge, and Prof. Fair said that about four-inch depths were used for practical reasons. If sludge depths were greater, the sludge would probably begin to eructate.

L. H. Enslow asked as to removal of dissolved oxygen from flowing water and the average demand of 5 p.p.m. per million gallon acre was given. Thus, with a 20 m.g. daily flow over 10 acres there would be

Henry Hotchkiss, Supervising Chemist, Water and Sewage Plants, Larchmont, N. Y.
H. B. Lippelt, Mechanical Engr., Dept. of Public Works, N. Y. C.
A. H. Goodman, Superintendent, Southwest Treatment Plant, Chicago. (Navigator of the "Queen Mary of the Prairie")

required $(5 \times 10 \div 20 = 2.5)$ 2.5 p.p.m. of oxygen to maintain aerobic conditions.

"Public Relations in the Costruction and Administration of Sewerage Works"—by Charles R. Velzy, Work Superintendent, Buffalo Sewer Authority, Buffalo, N. Y.

Mr. Velzy described the public relations field as a challenge to the engineering profession. When plant operators become publicity minded, they can best serve both themselves and the public. Under sev-

(1) The retiring president, George Andersen, a mere youngster, hears about sewage treatment of yesterday as compared with today from one long-in-the-game L. S. R. Hopkins, President of the Bacterial Sewage Purification Co. of N. Y., which has operated since 1900. (2) Geo. A. Mowbray, Supt. of Sewerage, Port Chester, N. Y., and Chas. Kirsuer, Chief Operator, Cedarhurst, L. I. (3) J. R. Forsyth, N. Y. City Board of Water Supply; C. D. Corey, Nilsson Electrical Laboratories, N. Y. City; Past-President Fred J. Biele, Cons. Engr., Huntington, L. I.; Nathan I. Cass, Operations Engr., Dept. of Public Works, N. Y. City. (4) J. W. Van Denburg, Mechanical Engr., D. P. W., N. Y. City; Prof. T. R. Camp, Mass. Institute Technology, Cambridge. (5) Wm. Sylvester, Asst. to the Chief Engr., D. P. W., N. Y. City; Geo. D. Carpenter, Supt. Water and Sewerage, Ithaca, N. Y.; Frank C. Roe, Mgr. Sanitary Sales, The Carborundum Co., Niagara Falls. (Host City for the Spring Meeting—June 19th and 21st.)

eral leading questions he developed the methods of best meeting public misconceptions and ignorance.

The reasons for explaining sewerage projects to the public, he noted, are that these projects are essential to public health and thus justify support; after plants are built, public officials must be educated to favor the employment of a qualified personnel and management.

Improvement of public relations depends upon those employees having contact with the public. Plant superintendents and operators may effectively utilize plant cleanliness and orderliness to impress visitors. Special efforts must be made to let the public know they are welcome. Visiting hours may be arranged and publicized.

Many adults may be reached through young people and personal invitations may be arranged for civic groups. At the time of the annual report, results of treatment will be found to have news value for local papers. The public relations committee of the New York Association proposes to improve relations between the public and plant operators. It hopes to be called upon for special publicity needs, and apparently justifies the cooperation of members.

"Operating Experiences at the Riverhead Activated Sludge Sewage Treatment Plant"—by Rodney E. Cook, Sanitary Engineer, Suffolk County Dept. Health, and Raymond Corwin, Sewage Plant Operator, Riverhead, N. Y.

There are no industrial wastes received at this plant, but the low water consumption (35 to 45 gal. per capita per day) is responsible for a strong sewage. A reduction of more than 90 percent in B.O.D. and in suspended solids must be accomplished and chlorination is required.

Luncheon in the Administration Building at New York's Air Terminus—LaGuardia Field

The building in the center is the terminal of Pan American's Trans-Atlantic Clippers

Aeration is provided by means of American Well Works type downdraft mechanical aerators. In addition to pre- and final sludge settling units, a chlorine contact tank, and sludge drying beds comprise the treatment units. Stale sewage was received soon after the plant was started. Warm weather made prechlorination necessary to prevent odors, and caused bulking in final tanks. After one year of operation, excellent results are being obtained.

Many problems have been encountered and solved: the return of septic digester supernatant to the primary settling tank has been eliminated and now discharges to a section of the sludge drying bed for filtration. Troubles from large quantities of grease have been eliminated by the installation of skimming boards and by hand skimming. No successful cure for excessive growths of chironomus fly larvae has yet been found.

At present the average sewage flow is 200,000 gal, per day and the plant operates at only slightly more than 50 percent of its designed capacity. Recent analyses show that a 94 per cent removal of both B.O.D. and suspended solids are accomplished. With effluent chlorination, no coliform organisms are found in 1 ml. portions and the effluent is held "drinkable!" Future needs at the plant are a covered digester and covered sludge drying beds.

"Present Status of Sewage Treatment in the Boroughs of Queens and Brooklyn"—by Richard H. Gould, Acting Deputy Commissioner, Department of Public Works, New York City.

Mr. Gould's talk was designed to familiarize members with those plants to be visited on the inspection trip. By means of many lantern slides and an authoritative running comment, Mr. Gould carried out this purpose most capably. Operating features of existing plants were described, and the design features of those planned or building were elaborated upon.

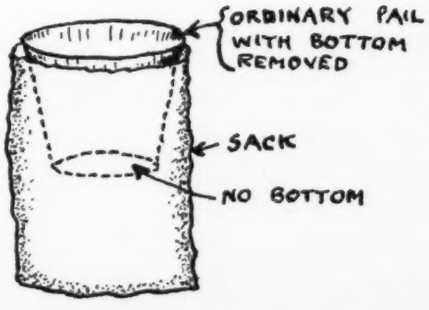
In reply to questions, Mr. Gould said that due to the local situation, all units of the Owls Head plant (chemical precipitation) must be under ground. Thus a great expanse of concrete roof will be available and will be utilized for tennis courts, handball courts, and other recreational activities.

When treatment plants now planned are constructed, the amount spent will total $180,000,000. Operating costs are about $11.00 per million gallons. All sewage discharged to Class A waters (Interstate Compact) is chlorinated.

SACK FILLING KINK*

When I was a boy, it was often my task to "hold sacks" while my father or someone else filled them. The sacks would continually sag over and twist, making it difficult to fill as well as to hold them.

An excellent kink developed by a bright young mechanic working in an Eastern manufacturing plant is illustrated in the sketch. The kink is a practical one and has been adopted by the employing company. Simply remove the bottom from an ordinary metal pail, insert the pail in the sack as shown, holding the pail and sack simultaneously in the positions indicated. By this means the sack can be filled more easily and more quickly and the holding job becomes much easier. In fact, by rigging up a post to hold the pail and sack one man can do all the work unassisted.



The bottom of the pail is most easily cut off by means of an ordinary can opener if a cutting torch is not available.

*Contributed by W. F. Schaphorst, M.E., Newark, N. J.

MAIN AND SERVICE INSTALLATIONS BY THE DRILLING METHOD

Some Experiences in a Small City

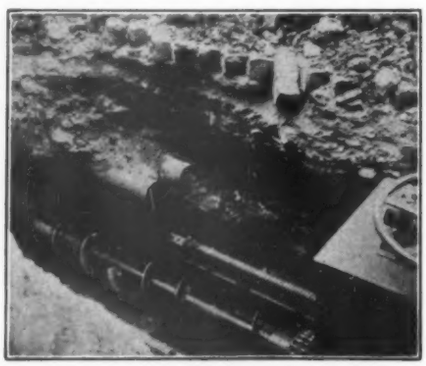
By OSCAR GENTRY
Foreman, Water and Gas Div.,
PARIS, ILLINOIS

THE accompanying photographs and records of drilling operations for the installation of service connections and small water mains under pavements in Paris, Ill., are of interest because of the low expenditures of time and money.

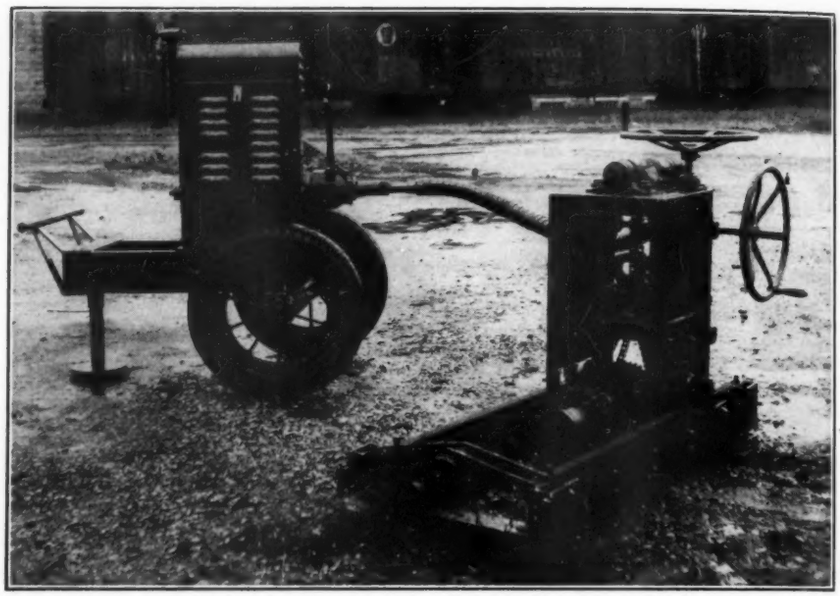
The work was done last July by the L. E. Meyers Construction Co. working for the Central Illinois Public Service Company. The report shows total time expended on the work in each street. No record was kept of the time on individual holes (67 in all) but the rate per foot varied considerably, due to different conditions encountered and the fact that the time constant (time required to install and remove drilling equipment) was proportionately larger on the short holes than on the long. No holes were lost; that is, every one was carried right through as started.

The equipment consisted of a Parmanco Drilling Machine, manufactured by the Paris Mfg. Co. of this city. The machine used is shown in the picture. The machine was operated by two men—a driller and a helper, working at the rate of 65c per hour each.

As indicated in the tables, the 1,752 feet of hole of Marshall street was drilled in 80 hours' actual working time—an average rate of 22 feet per hour, including time of moving from job to job and installing the machine at each. On Washington street the time was 112 machine-



Business End of the Parmanco
(As the drill moves in, to track limit, the machine is backed off and a new drill length added.)



The Two Units of the Parmanco Drilling Machine
(First section of drill in place.)

Record of Drilling on Marshall St.

4 ¼ inch Holes				10-inch Holes	
Hole No.	Length Feet	Hole No.	Length Feet	Hole No.	Length Feet
1	33	14	78	1	16
2	112	15	30	2	48
3	96	16	46	3	38
4	63	17	76	4	33
5	93	18	55		—
6	96	19	58	Total 10-in. Holes	135 ft.
7	92	20	36	Total 4¼-in. Holes	1,617 ft.
8	50	21	87		
9	48	22	81	Total number of feet drilled	1,752 ft.
10	63	23	45		
11	41	24	30		
12	48	25	64		
13	96	..	..		

Total 4¼-in. Holes ..... 1,617 ft.

Two-Men ten 8-hour days or 160 hours@65c	$104.00
Gasoline and oil	10.00
Total Operating Expense	$114.00

Average Cost per Foot—$114.00 ÷ 1,752 = $0.065

Record of Drilling in Washington St.

Total of 31 holes of 4½" diam. = 2,055 ft.
(longest hole, 114 ft.)
Total of 7 holes of 10" diam. = 280 ft.
(longest hole, 78 ft.)
2,335 ft. total

Four-Men seven 8-hour days or 224 hours@65c	$145.60
Gasoline and oil	14.60
Total Operating Expense	$160.20

Average Cost per Foot—$160.20 ÷ 2,335 = $0.069

hours—an average of 20.8 feet per hour for the total length of 2,335 feet. Average costs per foot of hole were 6.5c on Marshall street and 6.9c on Washington street.

The holes all ran very true to line, the maximum deflection at the finish being 4 inches, and most holes running within 1 inch of the point aimed at.

Obstacles encountered in the drilling included concrete, boulders and tree roots. To avoid deflections when hitting such objects at an angle, the operator slowed the forward movement of his drill to a point where it would cut into the hard material without developing appreciable side thrust. This, of course, required skill. A good operator on such work judges the character of what he strikes by the sound of his drill and the behavior of his machine, and controls the operation accordingly. He maintains control of direction at all times.

Pits in which the drilling machines operated measured approximately 3 feet by 6 feet. The costs of these holes have not been included in the accompanying records because they came under a separate contract.

It was estimated that if the 135 feet of main on Marshall street had been laid in open trench, the cost of replacing the brick pavement would have been $121.50. This was at the rate of 90c per lineal foot of trench 3 feet wide, which is equivalent to $2.70 per square yard, which is admittedly a rather low rate for such work.

DEVICE FOR FEEDING LIME SOLUTION

By E. T. CRANCH
Manager, New Rochelle Water Co.
NEW ROCHELLE, N. Y.

THE New Rochelle Water Company purchases its water from the Croton System of New York City. This is an impounded supply with a normal pH ranging from 6.8 to 7.2.

In order to absorb the free CO_2 and thus reduce the corrosive character of the water The New Rochelle Water Company treats all the water it takes from the Croton Aqueduct with lime to maintain a pH of 8.6. The water is lifted from the Croton Aqueduct by means of pumps located about 15 feet above the water level in the aqueduct. A saturated solution of lime water is continuously fed into the suction line.

It was found that lime would build up in the feed piping. By closing the corporation cock all the piping could be easily cleaned except the corporation cock itself, which became badly plugged and it was almost impossible to clean it without shutting down the pumps and losing the suction. As it takes about an hour to prime the suction header after the suction has been lost the station operators never liked to work on the corporation cock.

Then Mr. Herman Rohrs, at the pumping station, suggested that a connection to the suction line be made up similar to the usual type of device for feeding chlorine solution. Accordingly Mr. Charles Neydl, who has charge of the Meter Repair Shop, made up the device illustrated herewith which is easy to clean and has been operating very satisfactorily.

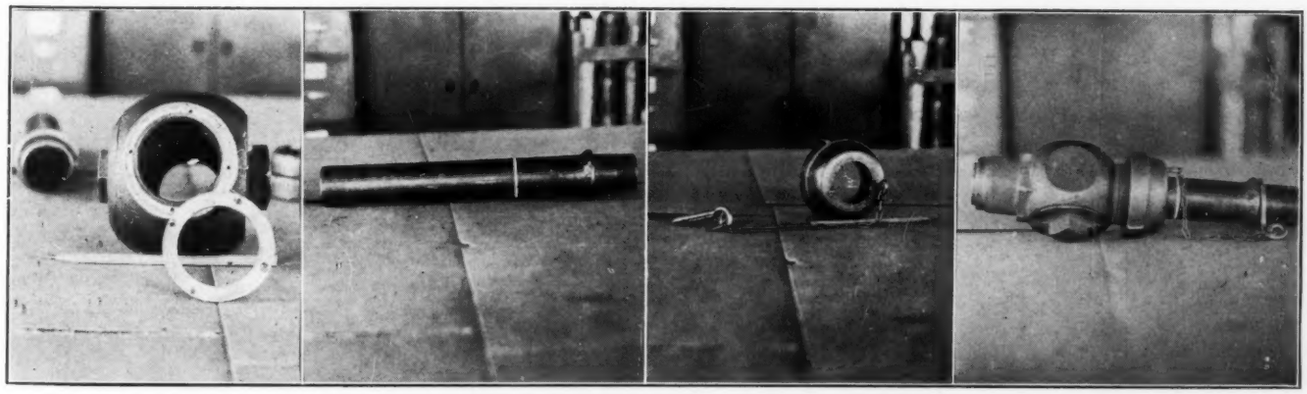
It will be noted that the device has a tube which slides through a gland and corporation cock and porjects into the main. It can easily be withdrawn under pressure, or suction, cleaned and returned.

Method of Installation

In order to insert this unit it was necessary to remove the old 1½ inch corporation-cock, drill out the old hole in the 30 inch cast iron suction line to fit a 2 inch corporation-cock and insert the new 2 inch cock. All this was done with a regular Mueller tapping-machine, with the loss of very little suction.

After the tapping machine was carefully centered over the existing 1½ inch corporation-cock the pumps were shut down and the vacuum priming device started. The 1½ inch cock was then removed by use of an extracting plug. Of course the check valve in the tapping machine did not hold against a negative pressure, but this was overcome by placing a board across the open end of the barrel of the tapping machine as soon as the top was removed. In this way so little suction was lost that the priming device had the pumps ready to start again by the time the insertion of the 2 inch corporation-cock was completed.

The accompanying photograhs were made for the writer by Mr. John Flanagan.



Injection Device—Compensation Parts and Assembly

(1.) *2" Corporation cock fitted with stuffing box plate exactly to fit 1½" Wrought Iron pipe.* (2.) *1½" Wrought Iron pipe with ring welded on it for stop-chain. White painted band indicates correct amount of insertion when feeding lime.* (3.) *2½" Cap drilled exactly to fit 1½" Wrought Iron pipe and equipped with rings and stop-chain.* (4.) *Assembled Unit.*

The Editor's Comments

A Key Decision In Regimentation of Waters?

NOT since establishment of the old, time tested, and hallowed English law of riparian rights regarding the waters of flowing streams and their use or abuse has there been an action of broad legal nature, pertaining to the status of rivers and streams, which seems likely to prove of the importance of that recently taken by America's highest tribunal.

Such a statement can be made as the result of the six-to-two decision rendered by the Supreme Court of the United States on December 16, 1940. It brought to a close a 15 year old case involving the extent of control which a Federal agency could constitutionally assume over the New River of Virginia. This important decision of the highest court of the land has, in the face of protests from the State of Virginia, which joined the owners of a dam and power development established on the New River in contending the requirements imposed by the Federal authority to be unconstitutional, established an entirely new precedent relative to Federal jurisdiction over, or the control of streams. The New River is a swift and rocky stream, flowing through mountainous country, with a drainage basin above the point of controversy entirely within the boundaries of the State of Virginia. In consequence of the location and type of stream that it is, this New River decision has broadened Federal control of streams and rivers to include those of a non-navigable nature; whereas, formerly Federal control has extended only to navigable waters.

The case in question, which had its beginning 15 years ago, centered on the attempt of the Federal Power Commission to require the Appalachian Power Co. to take out a federal license for its hydro-electric power project on the New River near Radford, Va. The State of Virginia supported the power company in opposing extension of such federal control to non-navigable waters on the grounds that such constituted invasion of states-rights. But the views of the Supreme Court appear in the majority opinion making up the decision of the Court, which states:

"In our view, it cannot properly be said that the constitutional power of the United States over its waters is limited to control for navigation. . . . Flood protection, *watershed development*, recovery of the cost of improvements through the utilization of power are likewise parts of commerce control.

"It is obvious that the uses to which a river may be put vary from carriage to ocean liners to the floating of logs. . . . To appraise the evidence of navigability on natural conditions, only, of the waterway is erroneous. Its *availability for navigation* must also be considered."

(The italics employed here for emphasis do not appear in the decision as rendered.)

From this point the opinion goes on to set forth that the fact of necessity of improvements and the need for establishing control works, to make an interstate stream available for traffic, should not place such waterways of the Nation without the scope of control of the Congress.

Based on these opinions, it is apparent that there is hardly a stream of any consequence in the United States which cannot be now considered as subject to Federal control when and if the occasion for such extended jurisdiction arises.

The question which this turn of events raises is an important one—more important than is at once realized. With high probability this will prove to be the key decision in the future regimentation of all surface waters of the United States.

The next question which naturally comes to mind is: Will such extended jurisdiction of Federal regulation of streams work for the benefit of the greatest numbers; prevent exploitation and further abuse of streams; prove to be for the benefit of the country as a whole? If these are to be the possible results, there will be no lamenting over the loss of state's rights in respect to stream management and control. The word regimentation implies something forced upon the regimented and is a term which we as Americans have learned to abhor, but possibly in this instance, as has proven true in others, some degree of so-called regimentation makes for the good of the greatest numbers. Let's hope that the New River decision proves to lead in this same direction.

When it comes to regimentation as it may apply to the natural waters of America it seems a pity that some sorely needed control cannot be more adequately exercised over the ground waters of America. While we have so long had the laws of riparian ownership and riparian rights have been so thoroughly established, as have laws covering water-use rights in the arid western sections of this country, the practice of water takings from wells has gone so long without the adequate regulation or control so much needed.

It has always seemed strange to us, that while a riparian owner has full recourse through the courts for securing an injunction or being compensated if damaged by a neighbor's act, resulting in depleted flow or injured quality of the waters of a stream or other surface supply, that there is no recourse open to the owner of a well who is subsequently inconvenienced or damaged when an individual, corporation or industry puts down wells and pumps from the same natural ground reservoir at such rates and in such quantities as to seriously impair the value of earlier established wells by lowering the ground water table and drawing in an unsatisfactory water thereby.

What seems even stranger is the fact that when regulation has been introduced it has largely applied to municipal ground water supply developments and little if any to what industrial interests decide to do in regard to putting down wells and drawing on the underground reservoir as seen fit. This condition surprisingly exists in England as well as America.

In the direction of securing more adequate regulation of ground water developments and takings we are informed that more has been accomplished in England by a considerable margin (London County in particular) than in this country, but until recent years attempts at securing needed regulatory legislation has met with little success even in England. And so this problem, needful of an adequate solution through regimentation, control, or whatever it takes, is something of an international thorn-in-the-flesh which needs removing.

Strange it is that oil well location, drilling, and pumping has been regulated for the past several years, while many water supply well owners are forced to drink salty water or go elsewhere. A little "regimentation" in regulating ground water usage and developments seems to be what is needed, whether it be the individual states or the federal government which looks to the job.

LINK-BELT Equipment

FOR POSITIVE RESULTS — LOW COST OPERATION

STRAIGHTLINE COLLECTORS

Link-Belt STRAIGHTLINE Sludge Collectors for the removal of sludge from rectangular settling tanks consist of two strands of especially processed malleable chain from which are suspended, at uniform intervals, scraper flights usually made from red wood. Features are peak-cap bearings, swiveling flights, cross collectors for larger tanks, and positive sludge removal at a slow, uniform speed. Automatic or semi-automatic skimming equipment is furnished when required.

Years of uninterrupted service in a great many plants throughout the country have proved the high efficiency, durability and low-cost maintenance features of these units.

Many features of the Link-Belt STRAIGHTLINE Collector are patented. Send for Book No. WWS-1742.

CIRCULINE COLLECTORS

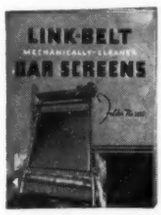
Link-Belt CIRCULINE Collectors for the removal of sludge from round tanks, consist of a flight conveyor suspended from a bridge, one end of which is pivoted at the center and the other travels around the circumference of the tank. Features are positive, slow, uniform speed, positive sludge removal and excellent distribution of flow throughout the tank. Automatic skimming is furnished when desired.

Send for Book No. WWS-1642.

BIO-FILTRATION System For Treating Sewage

Bio-Filtration Sewage Treatment System with Link-Belt STRAIGHTLINE and CIRCULINE Collectors brings new advantages. The system consists of high rate shallow filter beds and recirculation of the effluent from the filter beds to the primary tanks. Features are great flexibility, high rate of B.O.D. loading and the ability of such a plant to handle strong domestic and industrial sewage in single-stage or two-stage treatment, as required. Many installations of this type are now in operation and under construction.

Send for Folder No. WWS-1881.



STRAIGHTLINE Bar Screens

Link-Belt STRAIGHTLINE Mechanically-Cleaned Bar Screens have spaced parallel bars on which the larger floating solids in incoming sewage collect, and a mechanically operated rake for removal of the accumulating solids, thus assuring an even flow of sewage through the channel. The machine may be set vertically or inclined, and used in small or large plants. Send for Folder No. WWS-1587.

TRITOR Screens

The Link-Belt Tritor Screen is a combination of screen and grit chamber. It is especially designed for medium and small size plants. Its main elements are a hopper, a bar screen, and a bucket elevator for removing grit from hopper, the buckets being perforated for drainage. On return run, rake teeth on buckets clean the screen. An adjustable weir regulates velocity of flow through hopper.

Send for Folder No. WWS-1587.

INDUSTRIAL WASTE SCREENS

The Link-Belt Industrial Waste Screen is an efficient and economical unit for the removal of objectionable suspended solids from industrial waste before the water is discharged into sewers or streams. The screenings come off the machine with a minimum of moisture. Units are available in several sizes and with coarse or fine screen medium. Wastes from canneries, textile mills, steel mills, etc., are handled successfully by these screens.

Send for Folder No. WWS-1877.

STRAIGHTLINE Grit Collectors And Washers

The Link-Belt STRAIGHTLINE Grit Collector and Washer effectively collects, washes and removes settled grit and separates it from putrescible organic matter. This unit consists of a scraper type collector with pitched flights which turn the material over and over and discharges it into a washing and dewatering screw at the influent end of the tank, from which it is carried up an incline to a point of discharge.

Send for Folder No. WWS-1942.

Other LINK-BELT WATER and SEWAGE TREATMENT PLANT EQUIPMENT INCLUDES: STRAIGHTLINE Mixers for Flocculation Tanks; STRAIGHTLINE Scum Breakers for Digestion Tanks; Elevated Diffusers; Traveling Water-Intake Screens; Roto-Louvre Dryers for sludge and other wet materials; P.I.V. Gear Variable Speed Drive for Pumps; Coal and Ashes Handling Machinery; Car Spotters and Haulage Systems; Shovels-Cranes-Draglines—Crawler, Tractor and Truck Mounted; and a complete line of elevating, conveying and power transmitting equipment. Catalogs sent on request.

THE SYMBOL OF QUALITY LB LINK-BELT

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The SIMPLEX SAND EXPANSION INDICATOR

PROMOTES GREATER OPERATING EFFICIENCES
by

—Increasing Filter Runs
—Reducing Wash Water Costs
—Eliminating Mud Balls and Filter Cracks

FILTRATION PLANT efficiencies must depend on the satisfactory control of all operating functions.

The use of sand expansion as a means for wash water control has long been accepted, but until the development of the Simplex sand expansion indicator, no device was available by means of which this expansion could be definitely measured, noted, and checked at any period during the wash cycle.

Over 300 units installed and operating in such recognized plants as those in Allentown, Raleigh, Greensboro, Sandusky and Toledo, have proved that by their use greater operating efficiences have resulted because of increased filter runs, reduced costs, and elimination of troubles from mud balls and sand cracks.

The sand expansion indicator, low in price and simple in mechanical construction, fills the requirement.

WRITE FOR BULLETIN 60

Let us show you how its use will eliminate your operating problems and reduce costs.

SIMPLEX VALVE & METER CO.
6743 UPLAND STREET • PHILADELPHIA, PA.

MEETINGS SCHEDULED

Feb. 19—NEW BRUNSWICK, N. J. (Roger Smith Hotel)
New Jersey Section A.W.W.A. (Winter Meeting.) Secretary, C. B. Tygert, Box 178, Newark, N. J.

Feb. 20—BOSTON, MASS. (Hotel Statler)
New England Water Works Association. Secretary, Frank J. Gifford, 613 Statler Bldg., Boston, Mass.

March 3-7—URBANA, ILL. (University of Illinois)
Water Treatment Plant Operators' Short Course. C. W. Klassen, Chief Sanitary Engineer, Dept. Public Health, Springfield, Ill.

March 4—CLAREMONT, N. H.
New Hampshire Water Works Association. Secretary, Leonard W. Trager, New Hampshire State Board of Health, Concord, N. H.

March 20—BOSTON, MASS. (Hotel Statler)
New England Water Works Association. Secretary, Frank J. Gifford, 613 Statler Bldg., Boston, Mass.

March 20-21—TRENTON, N. J. (Stacy-Trent Hotel)
New Jersey Sewage Works Ass'n. (26th Annual Meeting) Treas., Paul Molitor, Jr., Box 374, Morristown, N. J.

March (tentative)—LAWRENCE, KANS.
Kansas Water & Sewage Works Ass'n. Sec'y-Treas., Earnest Boyce, State Board of Health, Lawrence, Kans.

March 21-23—YUMA, ARIZONA
Arizona Sewage & Water Works Association. Sec'y-Treas., F. C. Roberts, Jr., State Sanitary Engr., Board of Health, Phoenix, Ariz.

March 27-28—SYRACUSE, N. Y. (Hotel Syracuse)
New York Section A.W.W.A. Secretary, Rollo K. Blanchard, Neptune Meter Co., 50 West 50th Street, New York, N. Y.

April 2-4—BOSTON, MASS. (Hotel Statler)
New England Sewage Works Association. Sec'y-Treas., LeRoy W. VanKleeck, State Dept. of Health, Hartford, Conn.

(Meeting jointly with)

April 2-4—**New England Health Institute and New England Water Works Association.** Secretary, N.E.W.W.A., Frank J. Gifford, 613 Statler Bldg., Boston, Mass.

April ..—SALEM, N. J. (Salem Country Club)
South Jersey Ass'n. Water Superintendents. (Annual Meeting.) Secretary, Walter Spencer, 2707 Bethel Ave., Merchantsville, N. J.

April 9—WATERVILLE, ME.
Maine Water Utilities Association. Secretary, Earle A. Tarr, Winthrop, Maine. (Future scheduled meetings—June 11, Framington; Aug. 13, Lubec; Oct. 18, Kittery; Dec. 10, Bangor.)

April 14-16—FAYETTEVILLE, ARK. (University of Arkansas)
Arkansas Water & Sewage Conference. Secretary, Harrison Hale, 14 Chemistry Building, Fayetteville, Ark.

April 21-23—QUINCY, ILL.
Illinois Section A.W.W.A. Secretary, H. E. Hudson, Experimental Filtration Plant, Chicago, Ill.

April 24-25—INDIANAPOLIS, IND.
Indiana Section A.W.W.A. Secretary, Herman G. Horstman, Superintendent Water Distribution, Public Service Co. of Indiana, Traction Terminal Bldg., Indianapolis, Ind.

April 28-30—QUINCY, ILL. (Lincoln Douglas Hotel)
Illinois Section A.W.W.A. Secretary, H. E. Hudson, Jr., Experimental Filter Plant, 6843 Oglesby Ave., Chicago, Ill.

May 8-10—SEATTLE, WASH.
Pacific Northwest Sewage Works Ass'n. Secretary, Fred Merryfield, Oregon State College, Corvallis, Ore.

May 12-14—CHARLESTON, S. C. (Fort Sumpter Hotel)
Southeastern Section A.W.W.A. Sec'y-Treas., B. P. Rice, R.F.C. Healey Bldg., Atlanta, Ga.

May 15-16—CINCINNATI, OHIO.
Ohio Section A.W.W.A. Secretary, T. R. Lathrop, State Dept. of Health, Columbus, Ohio.

May 16—MISSOULA, MONT.
Montana Section A.W.W.A. Sec'y-Treas., H. B. Foote, Helena, Mont.

June 22-26—TORONTO, ONT. (Royal York Hotel)
American Water Works Association. Annual Convention. Secretary, Harry E. Jordan, 22 E. 40th St., New York, N. Y.

June 22-26—TORONTO, ONT. (Royal York Hotel)
Canadian Section A.W.W.A. (Annual Meeting.) Secretary, A. E. Berry, Ontario Department of Health, Parliament Buildings, Toronto, Ont. (Meeting Jointly with Annual Convention of A.W.W.A.)

Sept. 1-3—STATE COLLEGE, PENNA.
Pennsylvania Water Works Operators' Association. Sec'y-Treas., I. M. Glace, 22 South 22nd St., Harrisburg, Pa.
Sept. 23-26—BOSTON, MASS. (Hotel Statler)
New England Water Works Association. (Annual Convention.) Secretary, Frank J. Gifford, 613 Statler Bldg., Boston, Mass.
Sept. 24-26—GRAND RAPIDS, MICH.
Michigan Section A.W.W.A. Secretary, Maurice N. Gerardy, Department of Water Supply, Detroit, Michigan.
Oct. 13-16—FORT WORTH, TEXAS.
Southeast Section A.W.W.A. Secretary, L. A. Quigley, Supt. City Water Works, Fort Worth, Texas.
Oct. 22-25—FRESNO, CALIF. (Hotel Fresno)
California Section A.W.W.A. Sec'y-Treas., G. E. Arnold, San Francisco Water Department, Millbrae, Calif.
Nov. 6-7—BALTIMORE, MD.
Four States Section A.W.W.A. Secretary, Lloyd Nelson, U. S. Pipe and Foundry, Broad and Chestnut Streets, Philadelphia, Pa.

LITERATURE AND CATALOGS

"Aero-Filters by Rex" are presented in a new 30-page liberally illustrated bulletin from Chain Belt Co. of Milwaukee. The "Aero-Filter" offered by Chain Belt is the high-capacity trickling filter which makes use of the Halvorson-Smith Process (U. S. Patent No. 2,141,979) under which Chain Belt Company has been licensed. The bulletin announces that this company is now in position to offer reliable design data on the "Aero-Filter," based on operating results and experience with more than 50 plants now equipped with these units. The bulletin lists amongst the several advantages such matters as low first cost, low operating costs, and dependable results from high-capacity filters in single or two-stage installations, to meet requirements. Many of the going installations are picturized and operating performance is tabulated. Typical flow diagrams are numerous and the two types of distributors (the multiple arm rotary distributor equipped with low-head centrifugal spray nozzles for large filters, and the motorized revolving-disc center spray thrower for small filters) are described in some detail. For a copy of Bul. No. 329 which so adequately presents the story of the "Aero-Filter," write Chain Belt Co. (Sanitation Division), Milwaukee, Wis.

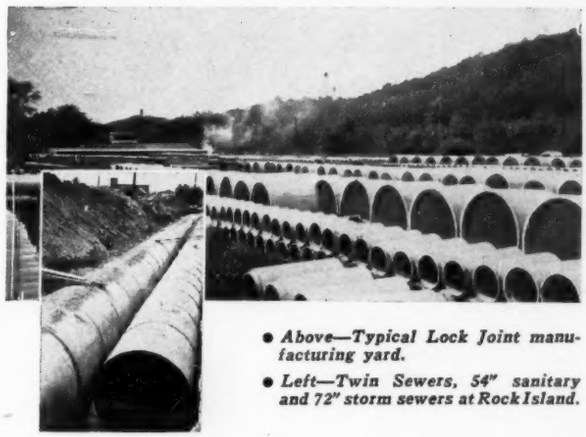
"Straightline Grit Collectors and Washers" are the subject of a new folder from Link-Belt Co. which describes and illustrates these units, which collect and wash grit removed from sewage. The grit chamber conveyor, having pitched flights, turns the deposited grit and organic materials over and over in moving it along the grit channel to the washing mechanism. The latter consists of an inclined washing and dewatering screw which agitates the material brought to it, thereby separating the true grit from the organic material. While the grit is traveling up the inclined screw it is washed and drained, and discharges cleaned at the upper end. The putrescible organics are floated away by currents created and directed by baffles in the influent channel and by a corresponding baffle and cover plate over the dewatering screw. Installation views at representative sewage plants, layout drawings, and specifications, add interest to Folder No. 1942. For a copy, write Link-Belt Co., 307 North Michigan Ave., Chicago, or 2045 W. Hunting Park Ave., Philadelphia.

"Bitumastic—for Proven Protection" is subject of a new general 24-page catalog from Wailes, Dove-Hermiston Corporation of Westfield, N. J., specialists for 80 years in coal-tar base protective coatings for

LOCK JOINT PIPE

used for Intercepting and Relief Sewers at

ROCK ISLAND, ILL.



● *Above—Typical Lock Joint manufacturing yard.*

● *Left—Twin Sewers, 54" sanitary and 72" storm sewers at Rock Island.*

● To minimize the flood menace and to provide adequate sewerage facilities, Rock Island has completed a modern sewerage system under the direction of Consoer, Townsend & Quinlan, Consulting Engineers, Chicago, Ill.

Over 78,000 ft. of Lock Joint Reinforced Concrete Pipe were used in this system. The pipe ranges from 24" to 108" in diameter and was manufactured by local labor in a plant erected at Rock Island especially for this job.

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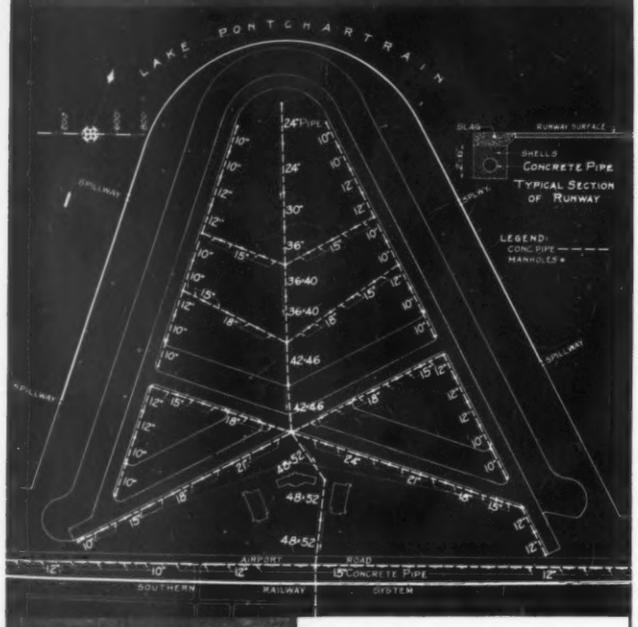

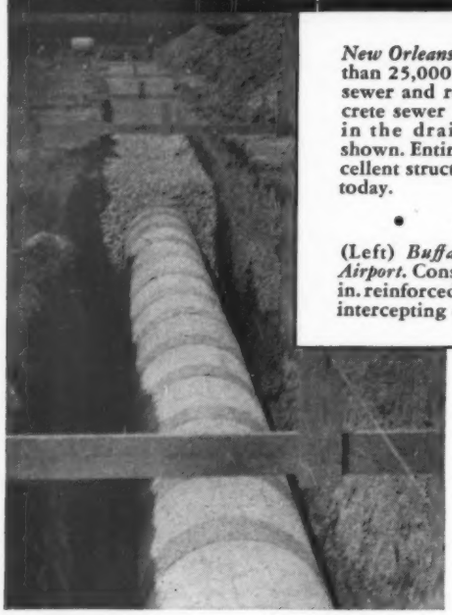

New Orleans Airport. More than 25,000 ft. of concrete sewer and reinforced concrete sewer pipe was used in the drainage system shown. Entire system in excellent structural condition today.

• • •

(Left) *Buffalo Municipal Airport.* Constructing a 36-in. reinforced concrete pipe intercepting drain.

MODERN airports must be properly drained. The ideal procedure is to design and build the complete drainage system as an integral part of the airport development.

At New Orleans Airport the drainage construction is *concrete pipe throughout. Concrete fully meets* ALL *the requirements of low first cost, structural safety, durability and maximum hydraulic capacity.*

Concrete pipe has been used to drain many of the country's leading airports. Write for literature on use of concrete pipe and reinforced concrete for your drainage or sewerage problem.

PORTLAND CEMENT ASSOCIATION
Dept. A2-29, 33 W. Grand Ave., Chicago, Ill.
A national organization to improve and extend the uses of concrete . . . through scientific research and engineering field work

hot or cold application. A goodly part of the catalog is devoted to water supply pipe lines, steel tanks, sewers and sewage treatment structures. Illustrations reveal applications of the hot applied Bitumastic Enamels and the cold applied Bitumastic No. 50, especially recommended for the protection of concrete surfaces, including concrete sewer pipe. At the end of the publication appears a useful "Coating Guide" which tabulates a variety of surfaces and gives the recommended primer and coating for the protection needed.

(In the January number of the monthly "Bitumastic Bulletin" appears an account of results attained with Bitumastic No. 50 for cold application by brushing on steel and concrete structures in sewage plants. To make a test available to engineers and operators a trial can of 1 gallon of Bitumastic No. 50 is being offered at just half-price to encourage trial applications. For further details, write Wailes, Dove-Hermiston Corp., Westfield, N. J.).

"Hoists, Trolleys and Cranes" are covered in a revised catalog of Wright hand operated hoisting equipment, trolleys and cranes. Complete data is included on spur-geared, screw-geared, and differential hoists, as well as considerable engineering data on cranes, trolleys and winches. Recent additions to the Wright line also appear in this new catalog. Anyone interested in hand operated hoisting and transfer equipment in water and sewage plants should request a copy of Catalog 12-C from the Wright Mfg. Div., American Chain and Cable Co., Inc., York, Penna.

"Amercoat—Corrosion Proof Plastic Coatings" are covered in a recently issued brochure from American Concrete and Steel Pipe Co. of Los Angeles which illustrates the diversified uses and describes the properties of the interesting Amercoat sprayable plastic which is markedly corrosion proof and extremely tough. The properties of protection that Amercoat gives, for example, are emphasized by pictures and text showing its use at sea where an ocean liner's water line strip—the "boot-topping"—is shielded from the terrific corrosive and abrasive action of wind and waves by Amercoat. Its value as a protector of metal against corrosive liquids is revealed in its use as a lining for storage tanks, and shipping containers, it being pointed out, that this plastic coating's pliable, abrasion-resistant film, is impervious to a long list of acids and alkalies.

We are reviewing this brochure with the thought in mind that Amercoat, which we learn was the outcome of attempts at developing a protective seal coat for concrete pipes as well as steel pipes, has potential interest in the water works and sewerage field—for instance in applying protective coatings on renovated meters and other equipment subject to tarnishing, corrision, as deterioration in appearance. For a copy of the Amercoat brochure, write American Concrete and Steel Pipe Co., Terminal Annex, Los Angeles.

"pH Electrometers" are presented in a recent bulletin from Wilkins-Anderson Co. of Chicago. These glass electrode pH Electrometers are being increasingly employed in water and sewage treatment plants for pH determinations in plant control, and "WACO" states—"Our recommendation as to selection of the most suitable instrument and electrodes—whether a Coleman, a Beckman, or the new Cameron Automatic Recorder—will undoubtedly aid you in your decision." Further than that, a 10-day free trial of the instrument recommended is suggested as the best means of

obtaining the proper and best instrument for lasting satisfaction. If interested in modern glass electrode pH testing, request Bulletin 203 from Wilkins-Anderson Co., 111 North Canal St., Chicago, Ill.

"Automatic Continuous Boiler Blowoff" is the subject of a new Permutit bulletin of interest. It tells why blowoff is necessary; points out the shortcomings of old or intermittent controls; and discusses several typical arrangements of modern continuous blowoff systems based on flash or non-flash, high or low heat level, single or group control operating characteristics. Various types of heat exchangers, flash tanks, as well as other Permutit developments which go to make up these systems are described in detail. For a copy of Bulletin No. 2391, write the Permutit Co., 330 W. 42nd St., New York City.

"GALE—Oil and Grease Separators," described and illustrated in a bulletin from the Gale Oil Separator Company of New York, are specially designed grease and oil traps for garages, hotels, restaurants, dry cleaning plants, etc. The Gale Trap has a capacity up to 18 gallons per min. for separating liquids. It is built of cast-iron, is made up from 6 assembly parts, and has 4 inch inlet and outlet openings. It has unique baffling features and is subject to cleaning without removing from service. For a copy of this grease interceptor bulletin, write the Gale Oil Separator Company, Inc., 405 Lexington Ave., New York City.

"Lubricators, by Hills-McCanna" are presented in a 16-page effectively illustrated catalog from Hills-McCanna Co., of Chicago, who have long specialized in lubricating equipment supplied the industrial field, some of the pictures revealing Hills-McCanna force-feed lubrication now in continuous use for 38 years. Alongside are shown Hills-McCanna lubrication of 1941, with the same basic simplicity of design and compactness but incorporating new pump valve features, the adaptation of modern corrosion proof metals and alloys of longer life, and internal double-ratchet driven pumps, productive of smooth balanced motion, durable sight glasses of Lucite plastic, and improved positive adjustment of oil feed. A cut-away view, with adequate description, reveals the exact workings of Hills-McCanna's time tested force-feed lubrication. On the front cover is a picture of interest to us. It shows a battery of 7 sludge filters in a sewage plant equipped with Hills-McCanna three point lubricators. Catalog No. L-40 contains illustrations and exact specifications covering the many models of lubricators offered, from single feed to 22 point feed units. For a copy write Hills-McCanna Co., 2349 Nelson St., Chicago.

"The Easiest Way" is the caption of a story of three chapters relating the worth of Dean Valve Operating Units for attaching to maintenance and emergency trucks. The story describes this mechanism now in use for 20 years for opening and closing valves on distribution systems. This unit is driven through a differential rod from the truck engine. Then described as the newest unit is the Dean Portable Airolectric Model. This tripod unit is employed independent of the truck and is powered with an air-motor, driven from an air compressor, or a 5 H.P. electric motor if the latter is preferred. On this unit is a revolution counter, revealing the number of turns of the stem of the valve being operated. The third unit described is the Dean Portable Valve and Power Truck, especially suitable for operating valves or sluice gates which have floor stands. For a copy of Dean's "Easiest Way" write Payne Dean, Box 728, Poughkeepsie, N. Y.

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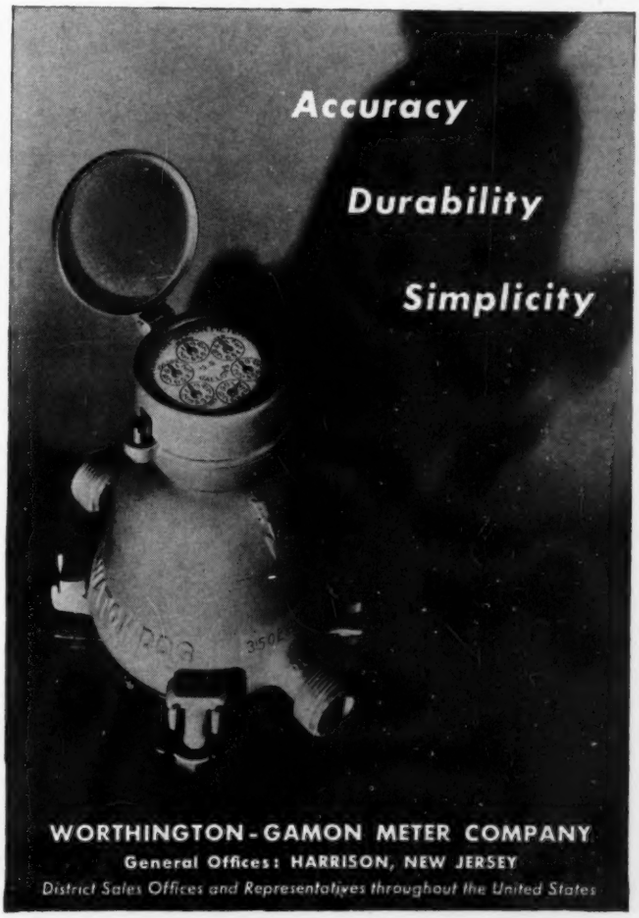

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Results for June, July, August and Sept., 1940

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Max.	.718	44.2
Min.	.202	12.5
Aver.	.355	21.9

	Return Effluent Flow M.G.D.	M.G A.D.
Max.	.153	9.42
Min.	.001	.06
Aver.	.035	2.15

Average returns in terms of raw sewage—10%.

Suspended Solids, P.P.M.

	Raw	Final Effl.
Max.	260	56
Min.	94	10
Aver.	165	27

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Max.	212	40
Min.	83	1
Aver.	125	14

POWER COST—ENTIRE PLANT—All sewage is pumped: 350 K.W.H. per M.G.

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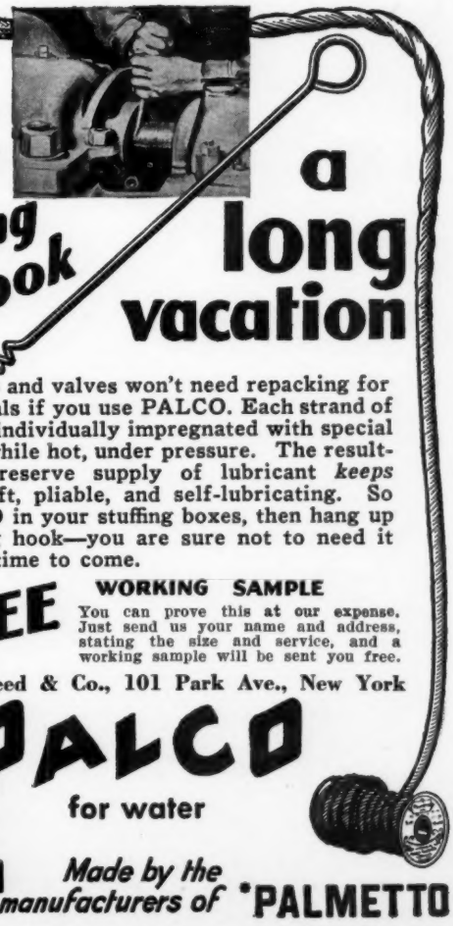
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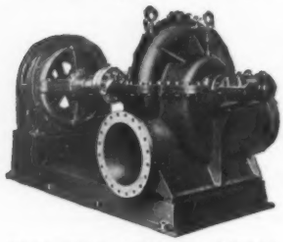

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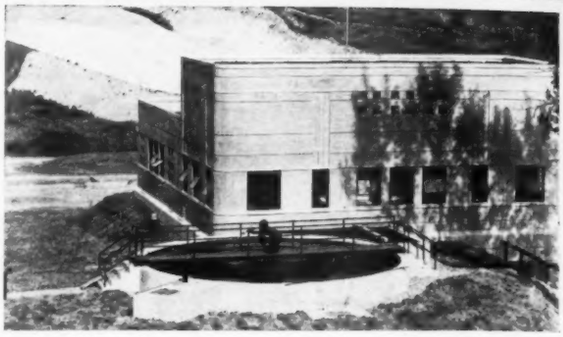

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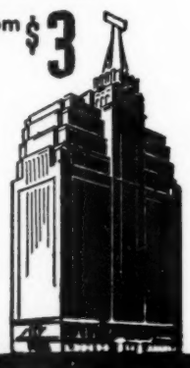

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EQUIPMENT NEWS

Truck Crane Speeds Pipe Laying

• An engineering project of major proportions is the distribution system for the Metropolitan Water District of Southern California, which serves the major cities of this area.

Obviously, laying large pipes for a system as extensive as this would be a costly, time-wasting job if the tripod method were used, necessitating the use of skids and chain blocks. Instead the District successfully employed truck cranes to handle the heavy pipe sections.

The photograph shows a P&H truck crane (9 ton capacity), working on the section between La Verne and Whittier, California, a distance of about 20 miles. This machine can travel at average traffic speeds, keeping pace with the trucks as they bring up the pipe. Moving alongside a truck, the crane hooks onto a pipe section, lifts it off the truck, swings it over to the ditch, and lowers it into position.

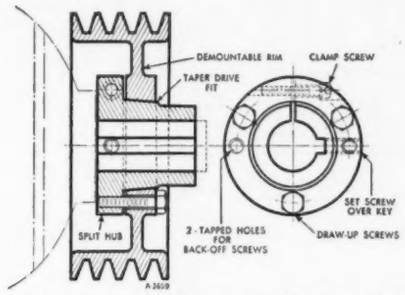
The pipe sections weigh from 3500 to 3800 pounds each, and the advantage of being able to unload and place such heavy material in a single operation resulted in significant savings in time and money. In addition these truck cranes have resulted in speed and savings in handling and laying C. I. and long length steel pipes.

Further information on P&H truck cranes may be obtained by writing the Harnischfeger Corporation, Milwaukee, Wisc.

Worthington Improves V-Belt Drives

• A new type of V-Belt driver sheave, designated as the Q-D quick detachable and quick demountable type, is announced by Worthington Pump and Machinery Corporation, Harrison, New Jersey, as a standard item in its Multi-V-Drive line. Extreme simplicity of construction is claimed, and suitability for any application where quick mounting of sheave to shaft, and dismounting from shaft, are desirable.

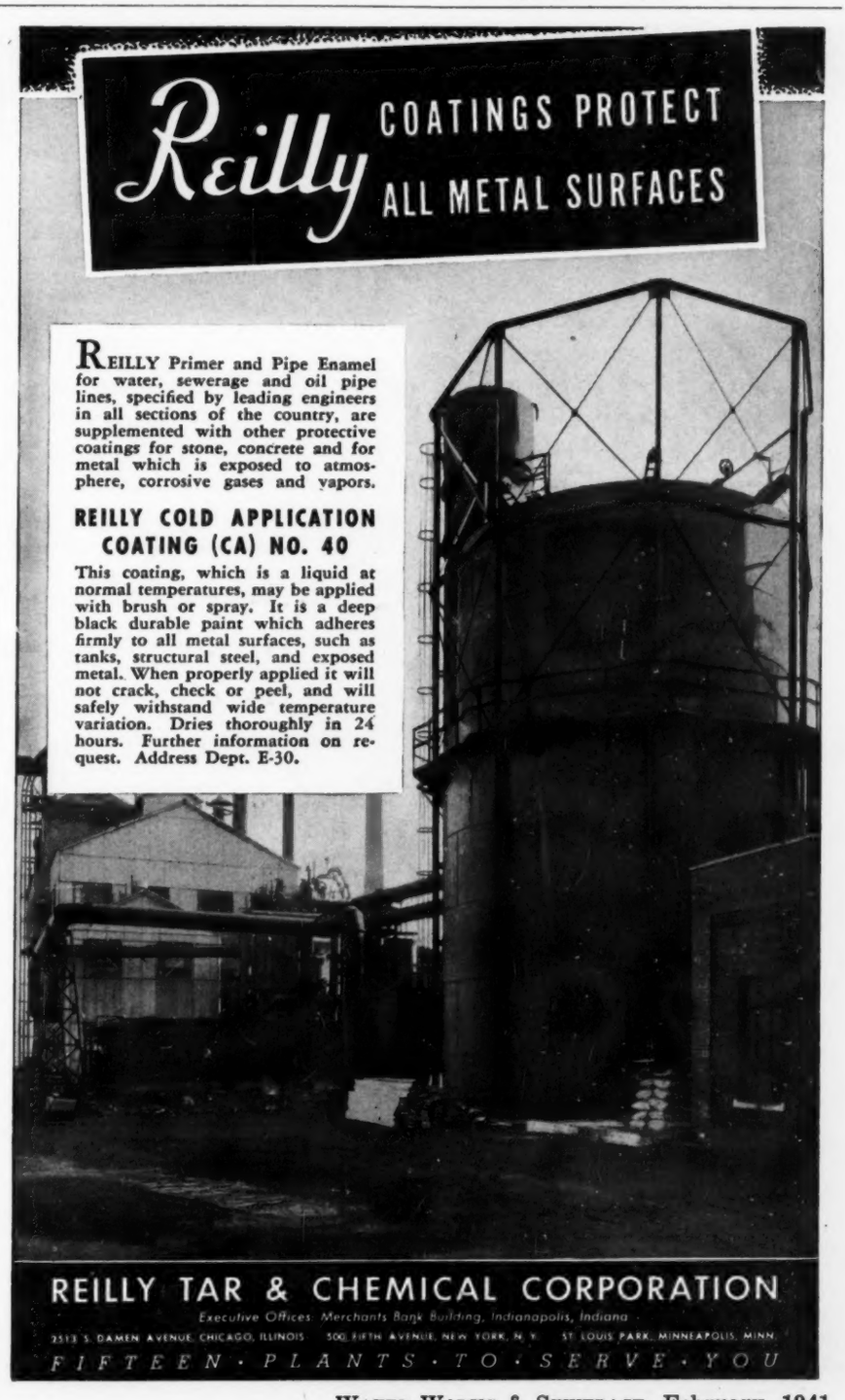
Each sheave unit consists of two parts, a longitudinally-split or clamp hub and a V-grooved rim. The hub is clamped to the shaft by means of a cap screw in its flange and is securely fastened by a standard keyway. A fit



equal to a press fit, on shafts up to ten thousandths over-size or under-size, is provided. The rim is taper-fitted to the hub and is fastened with three draw bolts.

No pounding or prying is required to remove either the rim or the hub. With this equipment, it is claimed that the dangers of battered motor bearings, bent shafts, broken sheaves, and human injury are eliminated.

The type Q-D sheaves are available in the complete range of standard driver sizes and are stocked at convenient points. Descriptive literature will be furnished upon request to Worthington, Harrison, N. J.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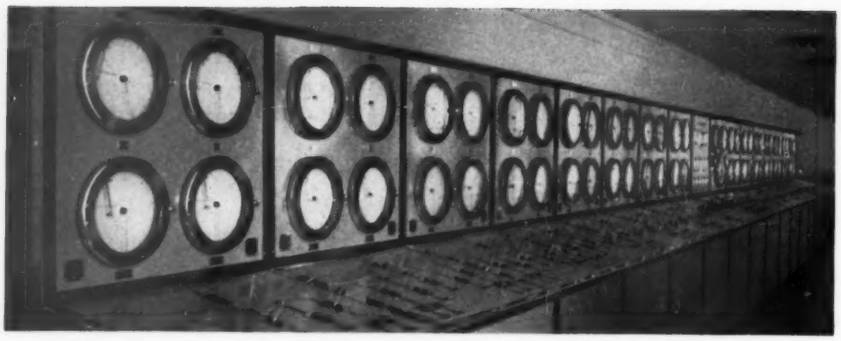

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Bulletin 320, recently issued, should be in your file. It contains a full description of Chronoflo Instruments; and of their application in measurement of flow, liquid level, pressure, and temperature.

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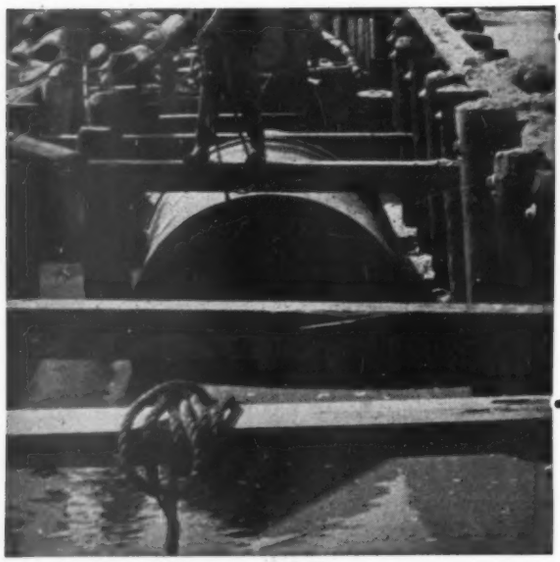

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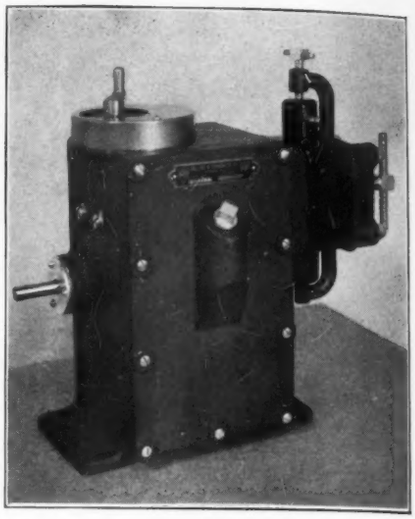
75 Federal St., Boston

New W. & T. Hypochlorinator



● Wallace & Tiernan Co., Inc., announces a new belt driven unit in its line of Hypochlorinators. All of the features inherent in W&T equipment—accuracy, reliability and efficiency—are claimed for this new addition to the line.

Because of the greatly increased need for safe drinking water in camps, on construction jobs, and out of the way places, it is believed that this new W&T Hypochlorinator will meet with a large demand. It is particularly adaptable where water is pumped by gasoline engine or where there is a drive shaft or power pulley available to supply the necessary motive power.

Construction is of the same heavy duty design as the other units of this well accepted line of equipment. Pumping is accomplished in the same manner as with other W&T Hypochlorinators. Gears and all moving parts run in an oil bath, providing ample lubrication at all times.

Operating at 720 r.p.m., the unit pumps 60 gallons of solution in 24 hours against a back pressure of 30 pounds per square inch. Adjustment is by a crank arrangement giving a range of capacities of 4:1, at constant shaft speed. Further, flexibility is provided by a change in shaft speed. Calibrations are arranged so that the same ratio applies between maximum and minimum, regardless of speed.

Solution being pumped comes in contact only with materials such as hard rubber, silver, and glass which are resistant to corrosive solutions. Its use, therefore, includes pumping many chemicals in addition to hypochlorite; for instance—caustic soda, copper sulphate, acids, silicates, polyphosphates, iron salts, nitrites, coagulants, aqua ammonia, ammonia salts, sulphite, etc.

For complete information, write Wallace & Tiernan Co., Inc., Box 178, Newark, N. J.

Lightweight 60 Cu. Ft. Compressor

● The Ingersoll-Rand lightweight engine driven mobile air compressor, with an air delivery capacity of 60 cu. ft. per minute at 100 lbs. discharge pressure, has many potential uses in the water and sewage field. It will operate paving drills, grinders, paint sprayers, concrete vibrators, back-fill tampers, pipe cutting and tapping machines, and other pneumatic equipment. It is also highly useful for blowing water from mains to be cut or repaired, by the well known Danvers' Method. It is also useful for blowing out service lines or scour-flushing small mains by the air-water mixture method described in the 1940 Reference and Data Issue (Apr.) of this magazine.

The generally increasing use of compressed air for such a variety of purposes almost makes a compressor of some sort a "must" in water works operation and maintenance.

Three models are available of the D-60 (1) the "Push-about," mounted on pneumatic tires; (2) the De Luxe Model which is spring mounted for high speed towing and has built on tool boxes; (3) the Utility Model, which has a steel base for mounting it on truck or trailer.

For details request the illustrated folder (Form No. 2688) from Ingersoll-Rand Co., 11 Broadway, New York City.

A Moisture Detector With Possibilities

The Delmhorst Moisture Detector, marketed by Colloid Equipment Co. of New York City, is a compact portable instrument measuring 2½ x 3 x 7 inches and weighing but 2 lbs. in the smallest size. The priciple on which it operates is relative-conductivity; the higher the moisture content the greater the conductivity, and the larger the current flow through the indicating calibrated meter. Needle-like electrodes are pushed into the material being examined and by pressing a button the moisture reading is had. The battery is gauranteed for a year.

The Delmhorst Detector has been most extensively used to determine if plaster walls or wood work is sufficiently moisture free for satisfactory painting, but has also been applied in many other uses. The thought in commenting on it in this column is that it may have decided possibilities in tracing and locating hidden water leaks in pipe lines or services; also for locating leaks in sewers or tracing leaks through porous concrete, or other masonry walls.

For descriptive literature and prices or a 10 day trial of a detector, write Colloid Equipment Co., 50 Church St., New York City.

LEADITE

The Pioneer Self-Caulking Material for C.I. Pipe

CUTS COSTS on the job!

Saves caulking time, digging time, melting time, handling time and charges . . . and makes a good tight joint that *improves* with age.

Internationally used and widely endorsed for over 35 years.

THE LEADITE COMPANY
Girard Trust Co., Bldg., Philadelphia, Pa.

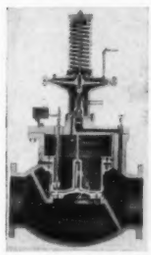
No Caulking

Automatic VALVES

Water pressure reducing and sustaining valves. Servicing costs low. Economical and dependable.

●

Stop starter single acting altitude valves. No metal to metal contacts result in minimum repairs and servicing costs.



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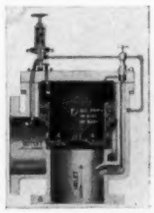
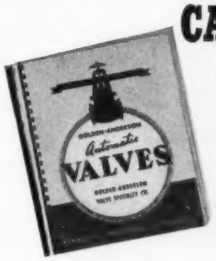


Water pressure relief valves. Simple, reliable and "grief" proof.

●

New 96-page CATALOG



Recognition of the valuably informative character of this new type catalog is indicated in the growing number of requests for it from water plant Engineers and Superintendents.

Write for your free copy today.

GOLDEN-ANDERSON VALVE SPECIALTY CO.
1329 Fulton Building
Pittsburgh, Pa.

THICK or THIN

Use Homelite non-clogging pumps for mud, sewage and sludge

Self-cleaning, free-flowing body

A Homelite Portable Pump takes the thick with the thin. It has a special free-flowing, self-cleaning body that handles up to 35% solids without clogging. It eliminates delays for cleaning. It does a better pumping job—even on the tough assignments.

Handles 15,000 gallons per hour

Even though a Homelite Pump weighs only 91 pounds, complete with built-in gasoline engine, it's a great big pump. It handles 15,000 gallons per hour. It has a 28-foot suction lift. It is fast self-priming—keeps seepage constantly under control. And it's built to take punishment day in and day out, on all kinds of jobs and in all kinds of weather.

Send for Illustrated bulletin.

HOMELITE CORPORATION

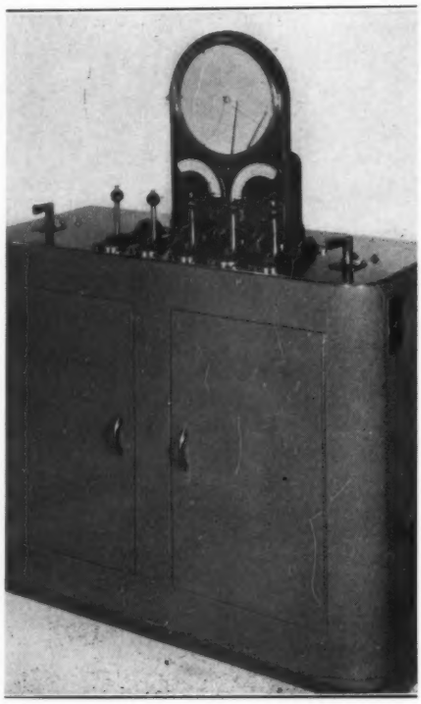
2502 RIVERDALE AVE. PORT CHESTER, N. Y.

Make your plans to attend the 61st Annual Meeting of the American Water Works Association, Toronto, Ontario, Canada, the week of June 22 to 26th, 1941.

New Streamline Operating Table

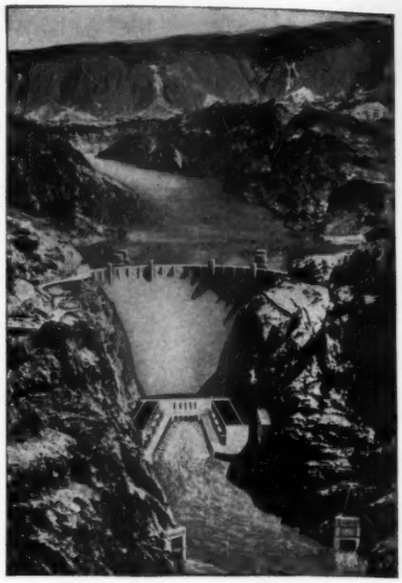
● Among recent developments in water works equipment, International Filter Co. of Chicago proudly exhibits its new streamlined operating table. It provides fingertip control of large filter or softening plants.

Constituting a major improvement in appearance of operating tables, this one is built of welded furniture steel, carefully shaped with smooth rounded corners and trimmed with bright chromium-finished strips. The top is of durable, battleship linoleum. The swinging non-warping doors are hung on full-length piano type hinges. The modern appearance of this cabinet is enhanced by the up-to-date Infilco operating levers, strip indicators, pump switches and loss of head and rate of flow gauges.



International's new table is now used for centralized control of back-washing, rewashing and other filter operations, and for regenerating and cleaning of softener beds. The equipment is shipped complete with Infilco 4-way hydraulic transfer switches mounted within the cabinet. This cuts installation time from days and hours to a matter of minutes.

The first installation of note is to be that in the new filter plant of Muskegon Heights, Mich. For descriptive literature write International Filter Co., 325 W. 25th Place, Chicago.



Bailey Meters AT BOULDER DAM

● In Boulder Dam Power Plant as in many other new hydro-electric stations including Madden Dam and Norris Dam, Bailey Fluid Meters are installed on hydraulic turbines.

At Boulder Canyon, the Bailey Meters measure water supply through 13 foot diameter penstocks under an average head of 530 feet. These meters indicate and record the water flow in terms of cubic feet per second and continuously integrate in millions of cubic feet. The registers are operated by pressure connections in the turbine scroll casings.

While your project probably does not entail the volume and head of water that is being measured at Boulder Canyon, it is nevertheless, important that your measurements of flow and liquid level be accurately made by reliable equipment.

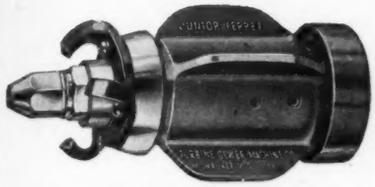
Write for complete information on the application of Bailey Meters to your problem. MU-19

BAILEY METER • COMPANY •

1072 Ivanhoe Road, Cleveland, Ohio

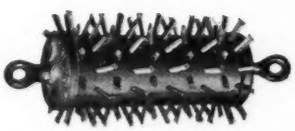
BAILEY METER COMPANY LTD., MONTREAL

START 1941 RIGHT

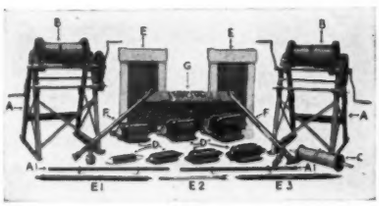


Self-Propelling Junior Ferret Turbine.
USED 6"-12" PIPES

Improved Rubber Jacket Flushing Bags.
ALL SIZES



Turco Hercules Sewer Brushes.



Turbine Sewer Drag System.

TURBINE SEWER MACH. CO., INC.

Office and Factory:
52nd & W. State St., Milwaukee, Wis.

N. Y. C., 276 Lafayette St.

WITH THE MANUFACTURERS

"Rollie" Leveque Joins Phipps & Bird of Richmond

Roland J. Leveque

● Phipps and Bird, Inc., of Richmond, Va., suppliers of laboratory equipment, chemicals and chemical feeders, announce that effective April 1st, Roland J. Leveque, Sup't of Filtration at Fredericksburg, Va., will become associated with them.

Mr. Leveque, a native of Hartford, Conn., came to Virginia a member of the U. S. Marine Corps during the first World War. As a musician he made a post-war hit in Fredericksburg and organized "Roland Leveque and His Orchestra," which has continued to be the most popular dance band in Northern Virginia. He became interested in Fredericksburg's new filter-plant, got a job in it; and, as he puts it—it was "Waterbugs by day and Jitterbugs by Night." But, he liked both well enough to continue his orchestra while he completed I. C. S. courses in engineering and chemistry and studied every publication dealing in water works practice that he could get his hands on.

After 12 years the "Rollie" Leveque orchestra now disbands; Fredericksburg loses a popular musician and a live wire Superintendent of Filtration who has won his spurs in the profession and the high regard of the water works fraternity of his adopted state. The Virginia Section of A. W. W. A. at its last meeting elected him Vice-Chairman. His ability came into evidence in the recent revamping and enlargement of the Fredericksburg Filter Plant, as well as in plant management and operation.

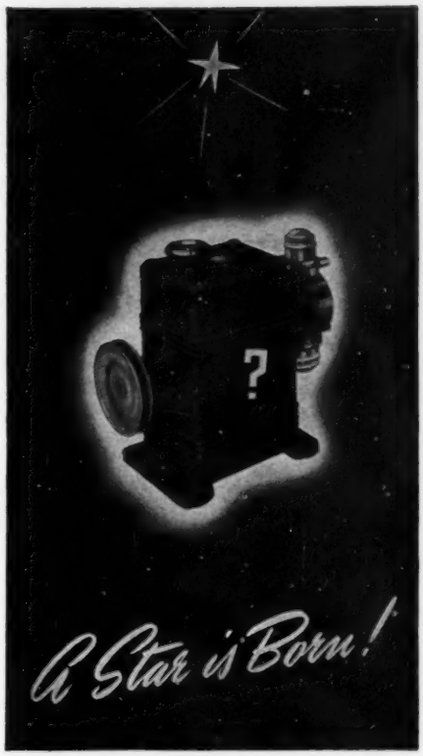
We understand that Mr. Leveque will assume a managerial position, created for him in the Phipps and Bird organization. And, we need hardly wish him success, for we realize that in this particular "Rollie" Leveque will need no wishing.

SALESMEN WANTED

or Manufacturers' Representative calling on Waterworks & Sewerage Superintendents and Engineers, to handle water and weather proofing products or represent as a side-line, our complete structural waterproofing service. Address American Fluresit Company, Cincinnati, Ohio.

Situation Wanted

CHEMICAL ENGINEER—with eight (8) years' experience in waste treatment and water treatment is looking for a position. Address "W. T." % Water Works & Sewerage, 155 East 44th St., New York, N. Y.



WHAT is the name of this **new** all-around, all-purpose chemical feeder—to be released for public sale at the end of February for delivery approximately April 1st?

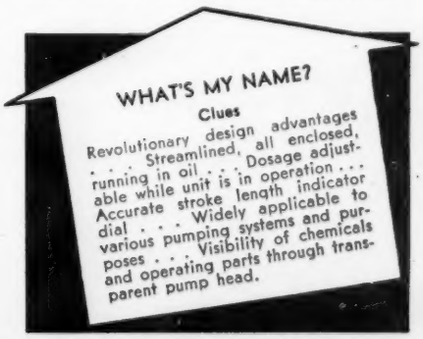
WHO is the manufacturer of this **new** chemical feeder—the last word in design; construction based on a mass of accumulated experience in small chemical feeder manufacture?

HOW much do you think you will be able to purchase this **new** all-purpose chemical feeder for? $425? — $265? — $1.95? — more? — less?

The man who guesses closest will be entitled to a 10% discount on the first machine purchased.

WHERE can you get further information about this latest contribution to the operating tools of the water works and sewerage fields?—as well as information on many problems of feeding chemicals automatically?

Write Box 241, % Water Works & Sewerage, 330 So. Wells St., Chicago, Ill.


WHAT'S MY NAME?
Clues
Revolutionary design advantages . . . Streamlined, all enclosed, running in oil . . . Dosage adjustable while unit is in operation . . . Accurate stroke length indicator dial . . . Widely applicable to various pumping systems and purposes . . . Visibility of chemicals and operating parts through transparent pump head.

AER·O·MIX
AERATOR—MIXER

Down-Draft Type
MECHANICAL
SEWAGE AERATORS

Write for information on AER-O-MIX for your SEWAGE or WATER TREATMENT APPLICATION.

VOGT MFG. CO.
INCORPORATED
P. O. Box 1122 Louisville, Ky.

Ludlow Valve Elects

A. W. Thompson, President; Robert Bischoff Appointed Sales Manager

A. W. Thompson

Robert Bischoff

● Alfred W. Thompson has been elected President, Treasurer, and General Manager of The Ludlow Valve Manufacturing Co., Inc., of Troy, New York. He was formerly Vice President and General Manager.

Livingston W. Houston, who has been associated with the company for twenty-two years, and as President for the past eight years, was elected Chairman of the Board.

Other new officers elected were Harry Hoffman of 30 Pine Street, New York City, a Vice President, and John Ireland of Troy, an Assistant Secretary and Assistant Treasurer.

Robert Bischoff was appointed Sales Manager, succeeding Joseph H. Egolf, Sr., who retired on December 31st, after 50 years of active service with Ludlow Valve, and as Treasurer and Sales Manager for the past eight years.

Mr. Bischoff was formerly associated with the S. Morgan Smith Co. as Asst. Manager of their Valve Division, and more recently with the Western Gas and Bartlett-Hayward Division of Koppers Co., in charge of Hydraulic Engineering and Valve Sales.

J. N. Kint Joins Pittsburgh Meter

● The appointment of J. N. Kint to the sales force of the Pittsburgh Equitable Meter Company and Merco Nordstrom Valve Company has been announced by H. Boezinger, District Manager.

To assist in the expanding activities of this concern, Mr. Kint will take over the sale of meters, valves, and other products manufactured by Pittsburgh Equitable Meter Company and Merco Nordstrom Valve Company to municipalities, water companies, and Federal and State projects within their Southern California territory.

For several years past, Mr. Kint has jointly represented Worthington Pump & Machinery Company, and several other manufacturers.

● ODOR and TASTE are health factors-too ●

THE WATER SUPPLY that pleases nose and palate is an important contribution to community health—people drink more of it.

ESOTOO* is the answer to a simple, sure and more economical method of controlling residual chlorine—especially in "break-point" chlorination.

ESOTOO* is the Ideal De-Chlorinator.

Write for bulletin which describes the "Virginia Method" of applying Liquid Sulfur Dioxide for Dechlorination.

V VIRGINIA

***ESOTOO is "Virginia's" Trade Name for Liquid Sulfur Dioxide.**

VIRGINIA SMELTING COMPANY
WEST NORFOLK, VIRGINIA

PITTSBURGH·DES MOINES

Steel Gasholders

Spherical or bullet types for efficient storage of digester gas under pressure in sewage treatment plants. Any size—any metal—designed to meet your specific requirements. An experienced P·DM engineer will gladly consult with you, without obligation.

PITTSBURGH · DES MOINES STEEL COMPANY
Pittsburgh, Pa. . . . 3418 Neville Island
Des Moines, Ia. . . . . 919 Tuttle Street

BEFORE CLEANING — THE NATIONAL METHOD — AFTER CLEANING

CLOGGED PIPES

Made Good as New

THE NATIONAL METHOD OF WATER MAIN CLEANING makes your old pipe practically as good as new. Every department is subject to loss through the ravages of time upon its distribution system. The cleaning out of this foreign matter inevitably leads to increased pressure and flow, improved health conditions, and lowered operating costs.

Our illustrated Booklet, "The Cleaning of Water Mains," will be sent upon request.

NATIONAL WATER MAIN CLEANING CO.
30 Church Street, New York, N. Y.

BRANCH ADDRESSES
205 West Wacker Drive, Chicago, Ill.
115 Peterboro St., Boston, Mass.
910 William Oliver Bldg., Atlanta, Ga.
7103 Dale Ave., St. Louis, Missouri
208 E. Forsyth St., Jacksonville, Fla.
3812 Castellar St., Omaha, Nebraska
501 Howard St., San Francisco, Calif.
2028 Union Ave., Montreal, Canada

Pipe Laying Jobs
NEED NOT BE DELAYED

waiting for that initial leakage to stop. Trenches need not remain open, with resulting hazards to traffic • When you use *Tegul*-MINERALEAD, these joints seal almost at once. You can backfill and clear up the street right away • *Tegul*-MINERALEAD is the sulphur-base, ingot form compound that

1—Seals initial leakage in a hurry.
2—Isn't hurt by rain, snow or flood.
3—Can't change composition in transit.
4—Needs no skilled labor, caulking or deep bell holes.
5—Makes permanently tight joints—much more resistant to thermal and mechanical shock.
6—Saves you labor, time and money.

A Tegul Product

Write The Atlas Mineral Products Company of Penna., Mertztown, Pa., Representatives (and stock carried) in many major cities.

Tegul-MINERALEAD

for Jointing Bell & Spigot Pipe

GRUENDLER—ESTABLISHED 1885

SEWAGE SCREENING SHREDDERS

Write today for Bulletins of our line of Reduction Machinery

Gruendler's Ball Bearing Trouble Free Sewage Shredders—Uniformly handles Sludge and Screenings so that 100% passes bar screen—eliminates trouble at Ball Valve and through system. Turn waste disposal into prepared fertilizer and profits.

Gruendler's Garbage Shredders
(Built in any capacity.)
Prepares Garbage and Rubbish for Incinerator or for Fuel

GRUENDLER
CRUSHER & PULVERIZER CO.
2920-28 N. Market St., St. Louis, Mo.

Chlorine Institute Holds Annual Meeting

Willard Jacobs Re-elected President

• At the Annual Meeting of The Chlorine Institute, Inc., held January 22nd at the Chemists' Club in New York City, the following were elected Directors for 2 year terms:

N. E. Bartlett, Pennsylvania Salt Mfg. Co.

Thomas Coyle, E. I. duPont deNemours & Co., Inc.

John A. Kienle, The Mathieson Alkali Works, Inc.

Louis Neuberg, Westvaco Chlorine Products Corp.

Eli Winkler, Columbia Division, Pittsburgh Plate Glass Co.

The hold-over directors are:

R. W. Hooker, Hooker Electrochemical Co.

S. W. Jacobs, Niagara Alkali Co.

E. C. Speiden, Innis, Speiden & Co.

At a Directors' Meeting following the Annual Meeting, the officers shown below were elected for the year 1941:

S. W. Jacobs, President.

E. C. Speiden, Vice President.

Robert T. Baldwin, Secy. and Treasurer.

Linn H. Enslow was reappointed Sanitary Engineer.

H. A. Faber, Research Chemist of the Institute, reported interestingly on progress and developments in chlorination of water, sewage and industrial wastes.

Diamond Alkali Establishes Texas Company

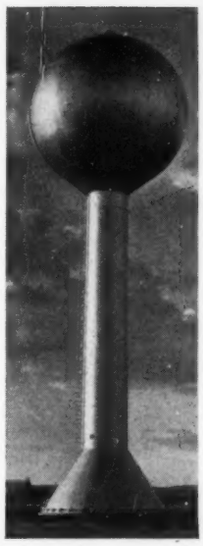
Gulf Coast Chemical Company Taken Over

• The Diamond Alkali Company of Texas was incorporated recently to manufacture and distribute chemicals in Texas. The new company has taken over the Gulf Coast Chemical Company. and will continue to operate this well established chemical business as a Division of Diamond Alkali Co. The main office of the Gulf Coast Chemical Division will be maintained in Houston, Texas, as well as branch offices in Dallas and other cities.

Diamond Alkali Company of Texas within the near future will start the construction of a new plant in Dallas to manufacture Silicate of Soda and other silicate products. It is expected that the new plant will begin operations in August of this year.

The Diamond Alkali Company is a large manufacturer of Chlorine, Soda Ash, Caustic Soda, Bicarbonate of Soda, Silicate of Soda, Carbon Tetrachloride and many other chemicals. The principal office is located in Pittsburgh, Pa., and the manufacturing plant is in Painesville, Ohio. For the Texas company S. W. Walters of Houston, Texas, is local manager of sales, and A. L. Geisinger of Pittsburgh, Pa., is in charge of construction and manufacturing.

RUSTA-RESTOR TRADE MARK REGISTERED
PATENTED PATS. PEND.



Cathodic Protection

The Electrical Method of Rust Prevention in all types of Steel Tanks and Their Riser Pipes

Quotations on Receipt of Tank Specifications

WRITE FOR LITERATURE

RUSTA RESTOR CORP.
1480 W. State Street
FREMONT OHIO

F Your Sewage effluents are high in suspended solids;

Or, you have a Water Problem;

Or, desire to Recover a product now wasted;

Or, you are disturbed by Stream Pollution;

Or, are in any way interested in the removal of suspended solids from liquors;

You should investigate the

Laughlin Modified Rapid Sand Filter

BECAUSE, it is a simple automatic, continuous flow apparatus, designed on familiar lines, to accomplish a purpose without adding to the operator's troubles.

LAUGHLIN EQUIPMENT CORPORATION
270 Madison Ave., New York City

HYDRO-TITE

ONE POUND does the work of four pounds of lead. Much easier to use than lead and requires no caulking.

HYDRO-TITE joints are strong, very flexible and tight.

Write for our free trial offer.

HYDRAULIC DEVELOPMENT CORPORATION

MAIN SALES OFFICE - 50 CHURCH STREET, NEW YORK
GENERAL OFFICES AND WORKS - WEST MEDFORD STATION BOSTON, MASS.

OVER 25 YEARS WITHOUT A FAILURE

TAPAX

The ORIGINAL *and* FINEST....

Manhole Cushion U. S. Pat. No. 2,050,050 offers you the simplest solution for noisy, rattling covers. Easy to install. Lasting — Economical.

Write for story of Tapax and Trial Offer.

TAPAX MFG. CO., INC.
MAMARONECK NEW YORK

WILSON CHEMICAL FEEDER

Outstanding features are quick feed adjustment, visible valves, flexible cylinders; feeds against 150-lb. pressure, and proof against corrosive chemicals.

Motor driven, positive displacement, pump type feeder. It is illustrated as a constant rate feeder though also furnished as Type MD-H with fluid meter control, and when so arranged is a measure-to-measure proportioning feeder.

This is a sturdy, dependable heavy duty feeder.

Write for Bulletin

Wilson Chemical Feeders, Inc.
BUFFALO, NEW YORK

M. P. Robinson Joins Worthington

● M. P. Robinson, proprietor of the Robinson Filter Company, has joined the Worthington Pump and Machinery Corporation organization to take charge of that corporation's newly organized water purification equipment division. Prior to the establishment of his own water purification company in 1937 Mr. Robinson had for seventeen years been eastern representative of the International Filter Co. of Chicago.

"VAREC" Establishes Office in Cleveland

● The Vapor Recovery Systems Co., Compton, Calif., manufacturers of "VAREC" Approved Equipment for handling combustible gases, announces the opening of a branch engineering and sales office at Cleveland, Ohio, under the personal supervision of Mr. James Finley.

James Finley Appointed Manager

Mr. Finley, a Californian, is a graduate mechanical engineer with years of experience, and is fully qualified to handle all problems relative to venting and gas control equipment.

This appointment and new office is part of the expansion program undertaken by Frank V. Long, President of "Varec," to better serve sewage treatment plants and designing engineers in the Central West.

Other "Varec" factory offices include New York City, Houston, Texas, and Tulsa, Oklahoma.

The new Central West office is located in the very heart of Cleveland, at 1010 Euclid Avenue.

WESTON

GASKET AND FORM
The Perfected Method for Making SEWER PIPE JOINTS OF CEMENT

- No jute used—gasket centers spigot.
- Definite space in each joint for cement.
- Form confines cement-grout to lower portion of joint.
- Particularly advantageous in water-bearing trenches.
- Infiltration minimized.

L. A. WESTON Adams, Mass.

THE ENSLOW STABILITY INDICATOR

Provides Continuous Corrosivity Index

Base weighing 12 pounds can be removed, permitting wall mounting. Well constructed throughout. Art Metal Finish.

Write for Full Details

Phipps & Bird, Inc.
RICHMOND, VA.

EDSON'S NEW HAND PUMP

Smallest Diaphragm Pump Made, 2" Suction Open Discharge. Capacity 1400 G.P.H. Weight 50 lbs.

THE EDSON CORP'N
49 "D" Street
So. Boston, Mass.
NEW YORK: 142 Ashland Pl., Brooklyn
CHICAGO: 1061 Peoples Gas Building

Catalog "T" Gives Full Data, Also Edson Hand and Power Pumps, Suction Hose and Pump Accessories

The Meter-Master

RATE RECORDER FOR WATER METERS

Send For Literature

F. S. BRAINARD & CO.
246 Palm Street, Hartford, Conn.

INQUIRIES INVITED on all Problems of Water Treatment

Whether your problem of water rectification is large or small, we have a form of equipment to serve your needs. We manufacture and install equipment for Gravity Filtration and Softening Plants; Pressure Filters and Zeolite Softeners; Swimming Pool Recirculating Appliances; and Water Treatment Units of all types.

ROBERTS FILTER MFG. CO.
607 COLUMBIA AVE DARBY, PA.

HYDE-RO RINGS

Specially designed RUBBER RING FOR PACKING ALL MAKES CAST IRON PIPE OR FITTINGS.

SANITARY—NO CONTAMINATION

QUICKLY INSTALLED—SAVING IN LABOR—HOLDS BACK WATER IN WET JOINT—NO LEAKAGE OF COMPOUND—LASTS INDEFINITELY

Now Available for
4-6-8-10-12 inch standard cast iron pipe.

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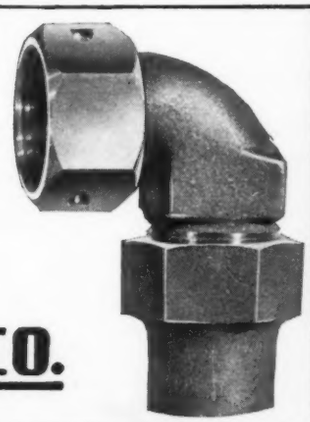

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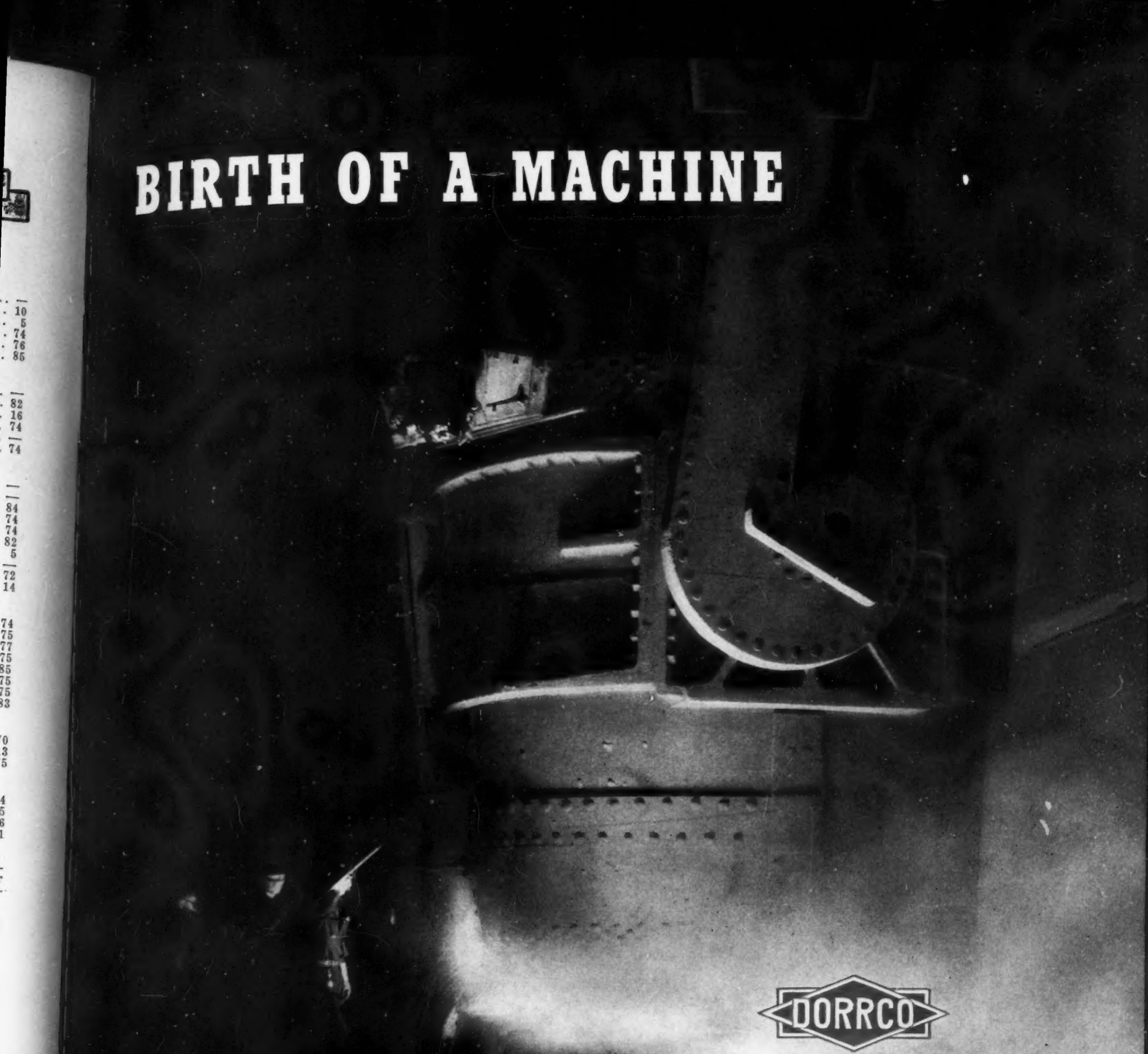

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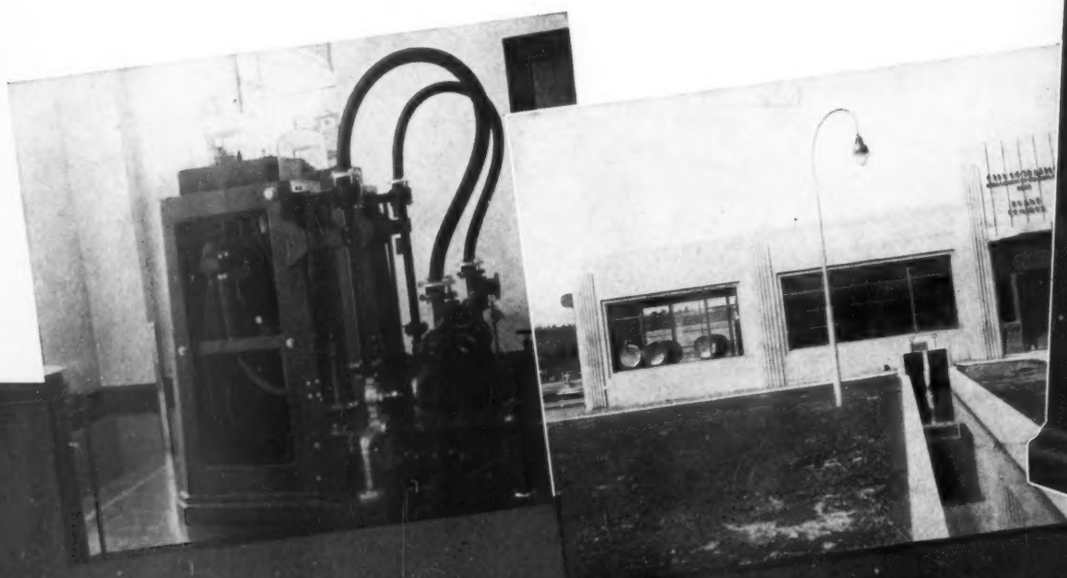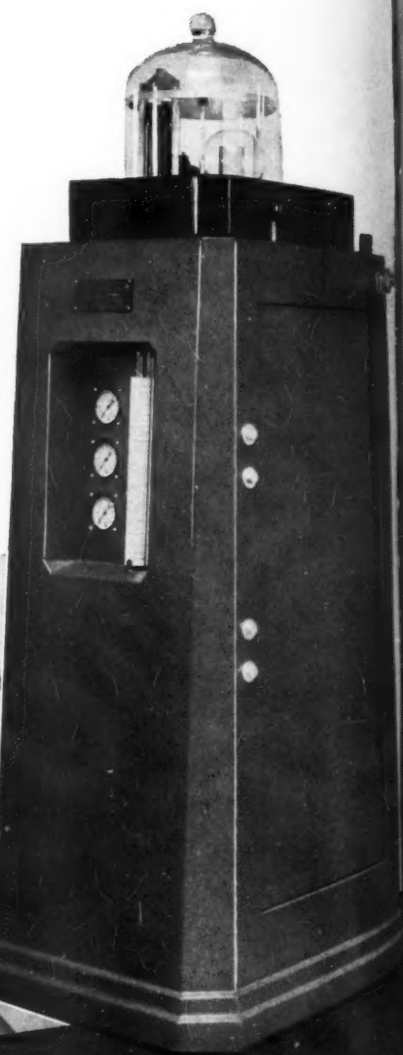
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